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Pretreatment of the Combined Industrial-Domestic Wastewaters of Hagerstown, Maryland. Appendix. Volume II

Kappe Associates, Inc, Rockville, MD Scientific Research Div

Prepared for

Robert S Kerr Environmental Research Lab, Ada, OK

Apr 78

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PRETREATMENT OF THE COMBINED INDUSTRIAL-DOMESTIC WASTEWATERS OF HAGERSTOWN, MARYLAND

APPENDIX
Volume II

by

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16. ABSTRACT

The sewage treatment plant of the city of Hagerstown, Maryland--a manufacturing city with about 130 industrial firms, which are classified in more than 25 different product categories--receives for treatment domestic sewage and a diversity of industrial waste and process waters. Some of these industrial wastewaters exert high immediate and ultimate oxygen demands that could not be satisfied by the treatment plant or were otherwise detrimental to the biological treatment processes of the treatment system. Therefore, certain methods of "pretreating" the city's combined wastewaters to render these waters more amenable to treatment by the existing treatment plant were tried and evaluated. The pretreatment methods tested were intended to assist the plant in meeting the oxygen demands by providing initial oxidation. The methods were: diffuse aeration with and without the addition of waste activated sludge, chlorination, addition of sodium nitrate, and the addition of potassium permanganate. Ammoniation was also tried in an effort to destroy some of the more noxious industrial materials in the wastewaters. Both aeration and chlorination proved to be effective methods of pretreatment, with the efficacy of aeration being enhanced somewhat by the addition of waste activated sludges. Both methods increased the BOD_5 removal efficiency of the plant under dry-weather conditions from less than 70% to better than 90%.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Activated Sludge, *Sewer Treatment	Hagerstown, Maryland Combined Industrial/ Municipal *Joint Treatment* *Pretreatment*	13B

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CITY OF HAGERSTOWN
MARYLAND

RECORD OF CHEMICALS CONSUMED

SURVEY OF INDUSTRIAL PLANTS

WASTEWATER TREATMENT R & D PROGRAM

PREPARED BY

_____

(Company)

Fall 1968

PROJECT STAFF OF THE HAGERSTOWN WASTEWATER TREATMENT R & D PROGRAM

Hon. Herman L. Mills, Mayor

Dr. David S. Kappe, Project Director

Dr. Charles E. Renn, Project Consultant

Mr. Robert E. Lakin, Design Engineer

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Mr. Leonard E. Wrigley, Plant Superintendent

Mr. James E. Eyerly, Project Site Manager

Mr. Neil F. Kershaw, Project Chemist

Mr. Michael Burdell, Project Chemical Technician

PRELIMINARY QUESTIONNAIRE

SURVEY OF INDUSTRIAL PLANTS
WASTEWATER TREATMENT R & D PROGRAM

PLEASE PROVIDE THE INFORMATION LISTED BELOW. If not enough space is allotted on the questionnaire to give fully the information requested, use either the backs of the form sheets or additional blank sheets to complete your answers. Insofar as questionnaires will not be collected until three to four weeks from date of issue and since the information requested is extremely important to the research effort, consider each point of inquiry carefully before answering, then answer each concisely yet fully as possible.

COMPANY:_____ PRODUCT(S):_____

ADDRESS:_____ _____

_____ _____

TELEPHONE:_____ NO. OF EMPLOYEES:_____

A. DESCRIPTION OF PLANT PROCESSES (In the space below, give a brief description or outline of the various plant processes, covering particularly those plant operations in which chemicals, solvents, dyestuffs, etc. are used and from which such process materials are discharged, spent or unspent, into the sanitary sewerage system of the city):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

B. CHEMICALS AND OTHER SUBSTANCES USED IN PLANT PROCESSES (List below those chemicals, solvents, dyestuffs, etc., which are used in the processes described above and which ultimately are discharged spent or unspent into the city's sewerage system. Indicate their purposes, the process steps in which they are employed, and the approximate amounts in which they are used daily):

	Chemical	Purpose	Process Employed	Amounts Used Daily
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

C. SOURCES AND QUANTITIES OF PROCESS WASTEWATERS (List below the various sources of process wastewaters and give the approximate daily volumes of the process wastewaters discharged from each source to the city's sanitary sewerage system. In addition, indicate whether discharges are continuous or batch. And, for batch discharges, give the approximate times during the day and/or week when such discharges occur):

	Wastewater Sources	Discharged Volumes (gallons)	Discharge Times
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

D. ESTIMATE OF THE TOTAL VOLUME OF PROCESS WASTEWATER DISCHARGED DAILY (gallons): _____

E. REMARKS (Use this space for comments as well as to furnish additional information which you feel may be pertinent to the research effort):

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answered by: _____

Title: _____

Date: _____

DAILY RECORD FORMS

INSTRUCTIONS: On the forms that follow, please keep an accurate day-to-day record of chemical usage in the plant--particularly, usage of those chemicals and substances that ultimately are discharged into the city's sanitary sewerage system. List all such chemicals and substances under the form heading "Chemicals & Other Substances," giving in the appropriate columns both their trade (common) names and chemical (scientific) names. If the chemical name of a chemical or substance is not known, give its trade name as found on its shipping container and the name of its manufacturer or supplier. Note: if there is not enough room on a single form page to list all chemicals and substances, use as many pages as are necessary to do so. Additional forms will be supplied as needed.

Under the column entitled "Units," give the units of measure in which the chemicals are used--gallons, liters, pounds, kilograms, etc. And, in the week-day columns under the heading "Quantities Consumed Daily," record each day the estimated number of units used of each chemical or substance listed. For example, assume that benzene is used in some plant process in gallon quantities. Write gallons or its abbreviation, gals., in the "Units" column in the same row that the name benzene appears. Thus, if 20 gallons of benzene is estimated to have been consumed in a plant operation on Tuesday, then write down 20 and only 20 in the proper place in the Tuesday column under the heading "Quantities Consumed Daily," the units "gallons" being already given in the units column.

For days when the amounts of chemicals used are not recorded and amounts cannot be estimated later, indicate the fact that the amounts used are unknown by placing question marks (?) in the appropriate spaces on the record form. On a day when a chemical which is listed is not used, be sure to indicate the fact that it was not used by placing either a dash (-) or a zero in the appropriate space on the record form. The use of question marks and dashes or zero's will help to differentiate between, respectively, not recorded and no chemical usage.

At the end of each week, from the daily usage record, compute for each chemical and substance the total amount used during the week and place the total in the proper space under the "Weekly Totals" column. Also fill in the signature block located in the lower right-hand corner of the record form. On the "Recorded from_____to_____" line write in the date of the Monday on which the record was begun and the date of the Sunday on which it was finished; e.g., Recorded from 9/16/68 to 9/22/68.

Use the "Remarks" block to explain any recorded item that needs an explanation, to record any item not covered on the form, and to give general comments.

A sample record form completed for the week of 16 September 1968 to 27 September 1968 is presented on the next page.

CHEMICALS & OTHER SUBSTANCES		UNITS	QUANTITIES CONSUMED DAILY							WEEKLY TOTALS
Trade Names	Chemical Names		Mon	Tues	Wed	Thur	Fri	Sat	Sun	
Process Water Used		gallons								
Process Water Dischg. into Sewers		gallons								

REMARKS:

Recorded by:

Title:

Recorded from: to:

Company:

CHEMICALS & OTHER SUBSTANCES			QUANTITIES CONSUMED DAILY							WEEKLY
Trade Names	Chemical Names	UNITS	Mon	Tues	Wed	Thur	Fri	Sat	Sun	TOTALS
Caustic Soda	Sodium Hydroxide	lbs.	8	8	8	8	8			40
Sodium Nitrite	Sodium Nitrite	lbs.	8	7	2	3	2			22
Zinc Hydrosulfite	Zinc Dithionite	lbs.	9		6	-	4			23
Sulfuric Acid	Sulfuric Acid	liters			12	7	10			51
Catalyst A3	(Rohm & Haas)	lbs.	2			1	1			6
Avitex NA	(Dupont)	lbs.	5			5	5			26
X-100 Detergent	(Humble Oil Co.)	gals.	3			3	2			10
Vinyl	Polyvinylacetate	lbs.	20	37			14			146
Sodium Bisulfite	Sodium Hydrogen-sulfite	lbs.	16	16			10			78
Potassium Bichromate	Potassium Dichromate	lbs.	25	25	23					120
Copper Cyanide	Copper Cyanide	lbs.	10	-	5					23
Sodium Peroxide	Sodium Peroxide	lbs.	10	8	12					49
Trichlorobenzene	Trichlorobenzene	gals.	10	10	10	10				50
Salt	Sodium Chloride	lbs.	(5)?	7	5	4				25
Process Water Used		gallons	12000	12000	12000	12000	8000			56000
Process Water Dischg. into Sewers		gallons	8000	8000	8000	8000	6000			38000

SAMPLE COPY

SAMPLE COPY

REMARKS: 9/17/68 - no plating operation

Recorded by:

Title: Chief of Plant Operation

Recorded from: 9/16/68 to: 9/22/68

Company:

APPENDIX B

EXPERIMENTAL DATA

PRETREATMENT BY AERATION AND ADDITION OF WASTE SLUDGE AND BY PLAIN AERATION

Table 12. WASTEWATER FLOWS AND TEMPERATURES
PRETREATMENT BY AERATION AND SLUDGE ADDITION AND PLAIN AERATION
TREATMENT SYSTEMS A AND B

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
5/19/70	--	2.6	--	--
5/20/70	3.8	2.6	6.37	64
5/21/70	3.4	2.7	6.10	64
5/22/70	3.4	2.6	6.03	65
5/23/70	3.3	2.3	5.61	--
5/24/70	3.1	2.4	5.54	--
5/25/70	3.8	2.6	6.35	65
5/26/70	3.4	2.6	6.03	66
5/27/70	3.1	2.5	5.65	65
5/28/70	3.2	2.3	5.46	64
5/29/70	3.0	2.3	5.29	--
5/30/70	2.5	2.2	4.71	--
5/31/70	2.1	2.3	4.45	--

Table 12. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
6/1/70	3.1	2.3	5.45	65
6/2/70	3.1	2.4	5.49	67
6/3/70	3.2	2.6	5.75	69
6/4/70	3.2	2.6	5.85	78
6/5/70	5.7	3.1	8.82	75
6/6/70	5.0	2.9	7.89	--
6/7/70	4.1	2.8	6.94	--
6/8/70	4.4	2.8	7.21	70
6/9/70	4.3	2.7	7.01	69
6/10/70	4.0	2.8	6.79	69
6/11/70	4.0	2.6	6.64	64
6/12/70	3.9	2.7	6.56	63
6/13/70	3.5	2.5	5.95	--
6/14/70	2.8	2.5	5.28	60

Table 12. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
6/15/70	3.2	2.7	5.87	--
6/16/70	4.6	2.8	7.44	59
6/17/70	4.5	2.8	7.30	61
6/18/70	4.9	2.9	7.81	--
6/19/70	5.2	3.0	8.17	--
6/20/70	4.6	2.9	7.51	--
6/21/70	4.3	2.8	7.09	--
6/22/70	5.0	2.9	7.89	--
6/23/70	4.7	2.9	7.57	--
6/24/70	4.4	2.8	7.25	63
6/25/70	4.4	2.8	7.15	63
6/26/70	--	--	8.16	63
6/27/70	5.4	3.1	8.48	--

Table 12. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
6/28/70	--	3.0	8.21	--
6/29/70	--	2.9	8.06	61
6/30/70	--	2.9	6.54	64
7/1/70	4.9	2.9	7.75	63
7/2/70	4.8	2.9	7.71	65
7/3/70	4.5	2.9	7.44	--
7/4/70	4.4	2.8	7.18	--
7/5/70	3.9	2.8	6.69	--
7/6/70	3.7	2.8	6.54	63
7/7/70	3.4	2.8	6.22	64
7/8/70	4.2	2.8	6.96	65
7/9/70	4.0	3.4	7.37	62
7/10/70	9.5	3.5	12.97**	62

Table 12. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
7/11/70	7.4	3.4	10.79**	--
7/12/70	6.1	3.3	9.45**	--
7/13/70	5.9	3.2	9.14**	--
7/14/70	5.7	3.1	8.80**	--
7/15/70	5.4	3.2	8.63	--
7/16/70	5.3	3.2	8.50	--
7/17/70	5.0	3.2	8.19	--
7/18/70	--	--	7.92	--
7/19/70	--	--	7.56	--
7/20/70	--	--	7.69	67
7/21/70	--	--	7.02	65
7/22/70	4.2	3.3	7.46	66
7/23/70	3.8	3.4	7.15	68

Table 12. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
7/24/70	3.8	3.3	7.10	--

* System A flows were derived by subtracting System B flows from Total flows since System A does not have means for direct flow measurement.

** When the total incoming flow reaches 8.8 mgd, part of the flow into System A is by-passed around System A secondary units and the total flow metering weir box.

Table 13. BOD_5 VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY AERATION AND ADDITION OF WASTE ACTIVATED SLUDGE TREATMENT SYSTEM A

Date Samples Composited	Pretreatment		BOD_5 Values (mg/l) of Wastewater Samples*				%BOD_5 Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
5/19/70	2100	-0-	22_7	26_2	17_7	49	78
5/21/70	2100	-0-	15_0	13_8	83	95	46
5/24/70	2100	-0-	29_7	26_7	17_4	55	81
5/25/70	2100	-0-	16	20	20	83	51
5/27/70	2100	-0-	31_6	29_1	24_2	23_7	25
5/29/70	2100	-0-	18_3	28_7	16_7	10_1	45
5/31/70	2100	-0-	21_3	19_1	12_3	25	88
6/2/70	2100	-0-	28_7	31_7	24_4	15_4	46
6/3/70	2500	0.090	--	--	--	--	--
6/4/70	2500	0.090	16_4	27_1	15_0	99	40
6/6/70	2500	0.090	14_4	14_3	13_9	57	60
6/8/70	2500	0.150	19_2	19_4	17_3	65	66

Table 13. continued

Date Samples Composited	Pretreatment		BOD_5 Values (mg/l) of Wastewater Samples*				$\%BOD_5$ Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
6/10/70	2500	0.150	25_7	32_5	21_7	82	68
6/12/70	2500	0.150	21_7	27_7	23_7	12_1	44
6/15/70	2500	0.150	19_2	18_5	12_5	40	79
6/17/70	2500	0.150	18_1	22_3	16_7	79	56
6/19/70	2500	0.150	25_3	27_0	24_3	82	68
6/21/70	2500	0.150	19_2	19_1	18_8	44	77
6/23/70	2500	0.150	24_3	Lost	18_1	74	70
6/24/70	2500	0.150	40_3	64_0	24_0	78	81
6/25/70	2500	0.150	16_8	69_0	28_6	98	42
6/28/70	2500	0.150	22_2	62_0	21_6	20	91
6/30/70	2500	0.150	83	36_7	19_6	41	51
7/2/70	2500	0.300	88	24_0	13_8	25	72
7/3/70	2500	0.300	12_0	71_3	21_6	30	75

Table 13. continued

Date Samples Composited	Pretreatment		BOD_5 Values (mg/l) of Wastewater Samples*				%BOD_5 Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
7/6/70	2000	0.300	23_1	79_5	28_4	32	86
7/8/70	2000	0.300	23_0	90_0	25_2	30	87
7/11/70	2000	0.300	13_4	78_0	13_5	17	87
7/22/70	2000	0.300	21_7	60_3	18_5	69	68

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 14. COD VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY AERATION AND ADDITION OF WASTE ACTIVATED SLUDGE TREATMENT SYSTEM A

Date Samples Composited	Pretreatment		COD Values (mg/l) of Wastewater Samples*				% COD Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
5/19/70	2100	-0-	--	--	--	--	--
5/20/70	2100	-0-	108_0	Lost	780	384	64
5/24/70	2100	-0-	748	500	294	270	64
5/26/70	2100	-0-	483	911	543	318	34
5/28/70	2100	-0-	806	877	604	306	62
5/29/70	2100	-0-	823	725	485	Lost	--
5/31/70	2100	-0-	722	643	410	137	81
6/3/70	2500	0.090	--	--	--	--	--
6/4/70	2500	0.090	380	'540	233	121	68
6/6/70	2500	0.090	370	471	352	120	68
6/8/70	2500	0.150	538	630	456	200	63
6/10/70	2500	0.150	560	147_6	696	264	53

Table 14. continued

Date Samples Composited	Pretreatment		COD Values (mg/l) of Wastewater Samples*				% COD Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
6/13/70	2500	0.150	524	776	720	324	38
6/15/70	2500	0.150	468	656	412	188	60
6/17/70	2500	0.150	488	804	488	168	65
6/19/70	2500	0.150	764	988	988	220	58
6/21/70	2500	0.150	712	720	572	160	78
6/23/70	2500	0.150	748	Lost	636	140	81
6/24/70	2500	0.150	150_2	266_8	200	884	41
6/25/70	2500	0.150	556	645_3	856	196	65
6/28/70	2500	0.150	944	224_0	728	84	91
6/30/70	2500	0.150	340	156_0	688	144	58
7/2/70	2500	0.300	428	480_0	532	96	78
7/3/70	2500	0.300	296	176_0	452	96	67

Table 14. continued

Date Samples Composited	Pretreatment		COD Values (mg/l) of Wastewater Samples*				% COD Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
7/6/70	2000	--	--	--	--	--	--
7/7/70	2000	0.300	892	368_0	Lost	96	89
7/8/70	2000	0.300	668	329_8	102_9	114	83
7/11/70	2000	0.300	824	Lost	868	68	92
7/21/70	2000	0.300	367	172_4	414	164	55
7/22/70	2000	0.300	630	229	763	290	54

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 15. SUSPENDED SOLIDS LEVELS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY AERATION AND ADDITION OF WASTE ACTIVATED SLUDGE TREATMENT SYSTEM A

Date Samples Composited	Pretreatment		SS Levels (mg/l) in Wastewater Samples*				% SS Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
5/19/70	2100	-0-	388	--	216	64	84
5/21/70	2100	-0-	156	--	96	108	31
5/22/70	2100	-0-	156	--	112	28	82
5/23/70	2100	-0-	240	--	132	40	83
5/24/70	2100	-0-	352	--	140	48	86
5/25/70	2100	-0-	452	--	168	28	94
5/26/70	2100	-0-	244	--	192	144	41
5/27/70	2100	-0-	516	--	236	108	79
5/28/70	2100	-0-	380	--	172	84	78
5/29/70	2100	-0-	360	--	232	128	64
5/30/70	2100	-0-	264	--	160	8	97
5/31/70	2100	-0-	148	--	140	56	62

Table 15. continued

Date Samples Composited	Pretreatment		SS Levels (mg/l) in Wastewater Samples*				% SS Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
6/1/70	2100	-0-	248	--	212	12	95
6/2/70	2100	-0-	304	--	284	48	84
6/3/70	2500	0.090	408	--	224	80	80
6/4/70	2500	0.090	184	--	216	68	63
6/5/70	2500	0.090	180	--	132	56	69
6/6/70	2500	0.090	148	--	144	16	89
6/7/70	2500	0.090	224	--	204	52	77
6/8/70	2500	0.150	276	--	209	40	85
6/9/70	2500	0.150	248	--	252	100	60
6/10/70	2500	0.150	260	--	296	56	78
6/11/70	2500	0.150	276	--	360	100	64
6/12/70	2500	0.150	644	--	528	124	81
6/13/70	2500	0.150	224	--	344	68	70

Table 15. continued

Date Samples Composited	Pretreatment		SS Levels (mg/l) in Wastewater Samples*				% SS Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
6/14/70	2500	0.150	544	--	--	--	--
6/15/70	2500	0.150	276	--	84	84	70
6/16/70	2500	0.150	640	--	496	72	89
6/17/70	2500	0.150	216	--	432	72	67
6/18/70	2500	0.150	664	--	948	164	75
6/19/70	2500	0.150	532	484	556	72	86
6/20/70	2500	0.150	88	--	224	64	27
6/21/70	2500	0.150	492	--	254	64	87
6/22/70	2500	0.150	356	--	220	52	85
6/23/70	2500	0.150	452	--	252	20	96
6/24/70	2500	0.150	368	--	508	56	85
6/25/70	2500	0.150	964	--	464	40	96
6/26/70	2500	0.150	208	--	428	32	84

Table 15. continued

Date Samples Composited	Pretreatment		SS Levels (mg/l) in Wastewater Samples*				% SS Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
6/27/70	2500	0.150	952	--	436	8	99
6/28/70	2500	0.150	84	--	280	52	38
6/29/70	2500	0.150	432	--	404	20	96
6/30/70	2500	0.150	256	--	300	24	91
7/1/70	2500	0.150	128	--	272	40	69
7/2/70	2500	0.300	288	--	212	28	91
7/3/70	2500	0.300	172	--	224	4	98
7/4/70	2500	0.300	212	--	340	4	98
7/5/70	2500	0.300	304	--	672	44	86
7/6/70	2000	0.300	144	--	816	40	72
7/7/70	2000	0.300	484	--	584	28	95
7/8/70	2000	0.300	296	2120	736	4	98

ERRATA SHEET

This page is inserted to correct a numbering error. There is no missing data page.

Table 15. continued

Date Samples Composited	Pretreatment		SS Levels (mg/l) in Wastewater Samples*				% SS Removal
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A	
7/9/70	2000	0.300	404	2808	648	40	90
7/10/70	2000	0.300	300	4880	296	32	89
7/11/70	2000	0.300	480	3460	328	60	88
7/21/70	2000	0.300	144	900**	196	16	89
7/22/70	2000	0.300	168	1400	456	40	76
7/23/70	2000	0.300	324	1620	400	44	86
7/24/70	2000	0.300	252	1300	608	44	83

* See Table on Wastewater Identification Code for Description of Wastewaters.

** Waste Activated Sludge suspended concentration was 3.66×10^3 mg/l on 7/21/70. Generally the waste solids concentrations ranged between 0.9 and 1.9%.

Table 16. HYDROGEN ION CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY AERATION AND ADDITION OF WASTE ACTIVATED SLUDGE TREATMENT SYSTEM A

Date Samples Composited	Pretreatment		pH Values of Wastewater Samples*			
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A
5/19/70	2100	-0-	--	--	--	--
5/20/70	2100	-0-	7.1	7.3	7.4	7.6
5/21/70	2100	-0-	7.1	7.4	7.4	7.3
5/22/70	2100	-0-	7.2	7.0	7.4	7.4
5/25/70	2100	-0-	7.2	7.5	7.0	7.7
5/26/70	2100	-0-	7.2	7.4	7.5	7.5
5/28/70	2100	-0-	7.1	7.2	7.4	7.4
6/1/70	2100	-0-	7.1	7.4	7.5	7.7
6/2/70	2100	-0-	7.2	7.4	7.4	7.5
6/3/70	2500	0.090	7.1	7.1	7.3	7.5
6/4/70	2500	0.090	7.2	7.2	7.3	7.4
6/5/70	2500	0.090	7.2	7.0	7.3	7.4

Table 16. continued

Date Samples Composited	Pretreatment		pH Values of Wastewater Samples*			
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A
6/8/70	2500	0.150	7.1	7.6	7.4	7.5
6/9/70	2500	0.150	7.1	7.5	7.4	7.4
6/10/70	2500	0.150	7.0	7.4	7.4	7.4
6/11/70	2500	0.150	7.0	7.2	7.4	7.5
6/12/70	2500	0.150	7.1	7.2	7.2	7.4
6/14/70	2500	0.150	7.2	7.5	7.4	7.3
6/16/70	2500	0.150	7.2	7.4	7.2	7.1
6/17/70	2500	0.150	7.2	7.6	7.3	7.2
6/18/70	2500	0.150	7.2	7.3	7.3	7.4
6/19/70	2500	0.150	7.3	7.4	7.3	7.2
6/20/70	2500	0.150	7.2	7.4	7.3	7.2
6/22/70	2500	0.150	7.2	7.4	7.0	7.3

Table 16. continued

Date Samples Composited	Pretreatment		pH Values of Wastewater Samples*			
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A
6/23/70	2500	0.150	7.2	7.4	7.3	7.2
6/24/70	2500	0.150	7.2	7.2	7.3	7.2
6/25/70	2500	0.150	8.0	7.2	7.2	7.2
6/26/70	2500	0.150	7.4	7.3	7.3	7.2
6/29/70	2500	0.150	7.2	7.3	7.5	7.6
6/30/70	2500	0.150	7.1	7.1	7.3	7.5
7/1/70	2500	0.150	7.1	7.1	7.4	7.5
7/2/70	2500	0.300	6.9	7.0	7.3	7.3
7/3/70	2500	0.300	6.8	6.9	7.3	7.6
7/6/70	2000	0.300	--	--	--	--
7/7/70	2000	0.300	6.7	6.7	7.1	7.3
7/8/70	2000	0.300	6.6	6.7	7.1	7.3

Table 16. continued

Date Samples Composited	Pretreatment		pH Values of Wastewater Samples*			
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	7A
7/9/70	2000	0.300	6.7	6.8	7.2	7.4
7/10/70	2000	0.300	6.5	6.3	7.0	7.1
7/21/70	2000	0.300	7.2	7.3	7.5	7.6
7/22/70	2000	0.300	7.3	7.3	7.3	7.5
7/23/70	2000	0.300	7.5	7.4	7.5	7.6
7/24/70	2000	0.300	7.5	7.3	7.4	7.4

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 17. DISSOLVED OXYGEN CONCENTRATIONS IN WASTEWATERS PRETREATMENT BY AERATION AND ADDITION OF WASTE ACTIVATED SLUDGE TREATMENT SYSTEM A

Date	Pretreatment		DO Concentrations (mg/l) in Wastewaters*											
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A11	4A12	4A21	4A22	5A1	5A2	6A1	6A2	7A
5/19/70	2100	-0-	--	--	--	--	--	--	--	--	--	--	--	--
5/20/70	2100	-0-	2.1	5.6	3.0	0.7	0.6	0.6	0.5	0.8	0.6	0.6	0.4	0.5
5/21/70	2100	-0-	1.7	5.3	1.9	0.2	0.4	0.4	0.4	0.8	0.3	0.3	0.3	0.4
5/22/70	2100	-0-	1.8	4.6	1.0	0.4	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.4
5/25/70	2100	-0-	2.0	5.5	2.6	0.3	0.4	0.2	0.4	0.6	0.2	0.4	0.3	0.4
5/26/70	2100	-0-	1.0	5.2	1.3	0.3	0.4	0.3	0.4	0.4	0.6	0.4	0.4	0.3
5/27/70	2100	-0-	1.8	5.1	1.2	0.4	0.5	0.6	0.4	0.4	0.4	0.6	0.4	0.4
5/28/70	2100	-0-	3.0	7.4	1.8	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.6	0.4
6/1/70	2100	-0-	1.4	3.4	0.5	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4
6/2/70	2100	-0-	2.0	5.9	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6
6/3/70	2500	0.090	2.0	4.5	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6
6/4/70	2500	0.090	1.2	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 17. continued

Date	Pretreatment		DO Concentrations (mg/l) in Wastewaters*											
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A11	4A12	4A21	4A22	5A1	5A2	6A1	6A2	7A
6/5/70	2500	0.090	2.2	5.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/8/70	2500	0.150	2.3	6.4	0.4	0.4	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0
6/9/70	2500	0.150	1.4	3.7	0.0	0.4	0.2	0.1	0.2	0.3	0.4	0.2	0.2	0.3
6/10/70	2500	0.150	1.3	3.2	0.1	0.4	0.2	0.1	0.1	0.4	0.0	0.4	0.0	0.4
6/11/70	2500	0.150	0.9	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
6/12/70	2500	0.150	1.5	1.6	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
6/15/70	2500	0.150	1.8	4.2	0.3	0.3	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.4
6/16/70	2500	0.150	1.7	6.4	0.6	0.4	0.2	0.0	0.0	0.3	0.2	0.4	0.3	0.5
6/17/70	2500	0.150	1.7	6.4	1.0	0.5	0.4	0.1	0.2	0.4	0.3	0.1	0.3	0.5
6/24/70	2500	0.150	1.6	4.6	0.1	0.4	0.1	0.2	0.2	0.2	0.1	0.7	0.9	0.6
6/25/70	2500	0.150	1.1	1.4	0.1	0.4	0.3	0.3	0.3	0.3	0.0	0.6	0.5	0.4
6/26/70	2500	0.150	1.7	1.3	0.4	0.4	0.2	0.2	0.1	0.1	0.1	0.5	0.4	0.3
6/29/70	2500	0.150	2.3	4.5	0.6	0.9	0.6	0.3	0.3	0.4	0.4	0.4	0.4	0.4

Table 17. continued

Date	Pretreatment		DO Concentrations (mg/l) in Wastewaters*											
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A11	4A12	4A21	4A22	5A1	5A2	6A1	6A2	7A
6/30/70	2500	0.150	1.8	4.6	1.1	0.7	0.4	0.4	0.4	0.5	0.3	0.2	0.4	0.5
7/1/70	2500	0.150	1.8	3.7	0.5	0.4	0.2	0.5	0.4	0.4	0.4	0.4	0.4	0.5
7/2/70	2500	0.300	1.4	3.7	0.5	0.7	0.5	0.5	0.4	0.5	0.5	0.4	0.3	0.3
7/6/70	2000	0.300	1.0	1.3	0.4	0.3	0.3	0.2	0.2	0.5	0.4	0.4	0.3	0.4
7/7/70	2000	0.300	1.0	1.2	0.3	0.5	0.3	0.4	0.2	0.3	0.6	0.4	0.4	0.5
7/8/70	2000	0.300	1.6	1.8	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.6	0.5
7/9/70	2000	0.300	1.0	1.2	0.7	0.8	0.6	0.7	0.5	0.5	0.6	0.5	0.6	0.7
7/10/70	2000	0.300	3.9**	5.4	2.1	0.9	0.6	0.6	0.9	0.9	2.4	2.7	2.8	1.1
7/20/70	2000	0.300	0.7	4.9	0.8	0.4	0.5	0.5	0.6	0.5	0.7	0.6	0.8	0.5
7/21/70	2000	0.300	0.8	3.1	0.6	0.4	0.5	0.4	0.6	0.5	0.6	0.5	0.5	0.4
7/22/70	2000	0.300	0.5	2.7	0.5	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4

Table 17. continued

Date	Pretreatment		DO Concentrations (mg/l) in Wastewaters*										
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A11	4A12	4A21	4A22	5A1	5A2	6A1	6A2	7A
7/23/70	2000	0.300	1.5	0.4	0.7	0.2	0.2	0.8	0.2	0.2	0.2	0.8	0.2	--

* See Table on Wastewater Identification Code for Description of Wastewaters.

** High Rainfall on 7/10/70

Table 18. HYDROGEN SULFIDE CONCENTRATIONS IN WASTEWATERS PRETREATMENT BY PREAERATION AND ADDITION OF WASTE ACTIVATED SLUDGES TREATMENT SYSTEM A

Date	Pretreatment		Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*							
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A12	4A22	5A1	5A2	7A
5/19/70	2100	-0-	--	--	--	**	**	**	**	--
5/20/70	2100	-0-	0.0	0.0	0.0	**	**	**	**	0.4
5/21/70	2100	-0-	0.0	0.0	0.0	**	**	**	**	0.2
5/22/70	2100	-0-	0.0	0.0	0.0	**	**	**	**	0.5
5/25/70	2100	-0-	0.0	0.0	0.0	--	--	--	--	0.0
5/26/70	2100	-0-	0.0	0.0	0.0	3.0	0.4	0.0	0.1	0.4
5/27/70	2100	-0-	0.0	0.0	0.0	0.0	5.0	0.0	0.1	0.0
5/28/70	2100	-0-	0.0	0.0	0.0	0.4	3.0	0.0	0.0	0.0
6/1/70	2100	-0-	0.0	0.0	0.0	0.5	0.4	0.4	0.4	0.0
6/2/70	2100	-0-	0.0	0.0	0.0	5.0	1.0	0.4	0.3	0.5
6/3/70	2500	0.090	0.0	0.0	0.0	5.0	5.0	2.0	1.0	0.0
6/4/70	2500	0.090	0.0	0.0	0.0	1.0	5.0	1.0	0.5	0.0

Table 18. continued

Date	Pretreatment		Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*							
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A12	4A22	5A1	5A2	7A
6/5/70	2500	0.090	0.0	0.0	0.0	1.0	2.0	0.3	0.3	0.0
6/6/70	2500	0.090	0.0	0.0	0.0	--	--	--	--	0.0
6/8/70	2500	0.150	0.0	0.0	0.0	0.2	1.0	0.0	0.1	0.0
6/9/70	2500	0.150	0.0	0.0	0.0	5.0	4.0	0.2	0.3	0.4
6/10/70	2500	0.150	0.0	0.0	0.0	4.0	1.0	0.0	0.0	0.0
6/11/70	2500	0.150	0.0	0.0	0.0	4.0	2.0	0.0	0.1	0.5
6/12/70	2500	0.150	0.0	0.0	0.0	5.0	1.5	0.4	1.0	1.0
6/16/70	2500	0.150	0.0	0.0	0.0	0.4	5.0	0.0	0.1	0.5
6/17/70	2500	0.150	0.0	0.0	0.0	> 5	3.0	0.5	0.3	0.5
6/18/70	2500	0.150	0.0	0.0	0.0	> 5	> 5	5.0	3.0	0.1
6/19/70	2500	0.150	0.0	0.0	0.0	> 5	> 5	1.0	0.4	1.0
6/20/70	2500	0.150	0.0	0.0	0.0	5.0	0.3	2.0	1.0	0.4
6/22/70	2500	0.150	0.0	0.0	0.0	> 5	2.0	0.3	0.1	0.1

Table 18. continued

Date	Pretreatment		Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*							
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A12	4A22	5A1	5A2	7A
6/23/70	2500	0.150	0.1	0.0	0.0	> 5	> 5	0.5	0.1	0.4
6/24/70	2500	0.150	0.0	0.0	0.0	2.0	1.0	5.0	0.0	2.0
6/25/70	2500	0.150	0.0	0.1	0.1	4.0	5.0	0.3	0.4	0.5
6/26/70	2500	0.150	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.1
6/29/70	2500	0.150	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/30/70	2500	0.150	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/1/70	2500	0.150	0.0	0.0	0.0	0.3	0.4	0.0	0.1	0.0
7/2/70	2500	300000	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0
7/6/70	2000	300000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/7/70	2000	300000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/8/70	2000	300000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/9/70	2000	300000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/10/70	2000	300000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 18. continued

Date	Pretreatment		Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*							
	Air Flow (cfm)	Sludge Flow (mgd)	1	2A	3A	4A12	4A22	5A1	5A2	7A
7/21/70	2000	300000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/22/70	2000	300000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/23/70	2000	300000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
7/24/70	2000	300000	0.0	0.0	0.0	0.5	1.5	0.0	0.0	0.0

* See Table on Wastewater Identification Code for Description of Wastewaters.

** Lead acetate papers placed over tank readily blackened to indicate H_2S evolution from wastewaters.

Table 19. OXIDATION-REDUCTION POTENTIALS OF WASTEWATERS* PRETREATMENT BY AERATION AND ADDITION OF WASTE ACTIVATED SLUDGE TREATMENT SYSTEM A

Date	Pretreatment		Oxidation-Reduction Potentials (mv) of Wastewaters**								
	Air Flow (cfm)	Sludge Flow (gpd)	1A	2A	3A	4A12	4A22	5A1	5A2	6A	7A
5/19/70	2100	-0-	--	--	--	--	--	--	--	--	--
5/20/70	2100	-0-	0	0	+10	-231	-250	-150	--	-150	-105
6/3/70	2500	90000	--	--	--	--	--	--	--	--	--
6/4/70	2500	90000	+135	+95	+70	-140	-250	-192	-200	- 20	-142
6/8/70	2500	150000	--	--	--	--	--	--	--	--	--
6/11/70	2500	150000	- 9	-30	-41	-260	-255	-210	-215	- 61	-180
6/17/70	2500	150000	+ 30	+25	+13	-253	--	-170	--	--	-190
7/1/70	2500	150000	+ 50	+50	+52	+ 10	+ 28	+ 10	20	- 1	0
7/2/70	2500	300000	--	--	--	--	--	--	--	--	--
7/6/70	2000	300000	--	--	--	--	--	--	--	--	--
7/11/70	2000	300000	+ 50	+42	+49	+ 52	+ 50	+ 42	+ 41	+ 30	+ 41

* Potentials measured with a saturated calomel electrode, E_{cal}.

** See Table on Wastewater Identification Code for Description of Wastewaters.

Table 20. BOD_5 VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY PLAIN AERATION TREATMENT SYSTEM B

Date Samples Composited	Pretreatment Air Flow (cfm)	BOD_5 Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% BOD_5 Removal
5/19/70	1000	22_7	18_5	99	10	95
5/21/70	1000	15_0	12_5	83	57	62
5/24/70	1000	29_7	21_8	92	16	94
5/25/70	1000	16_8	19_0	15_5	23	86
5/27/70	1000	31_6	20_6	20_2	43	86
5/29/70	1000	18_3	26_4	14_7	33	82
5/31/70	1000	21_3	20_5	85	25	88
6/2/70	1000	28_7	21_5	15_4	63	78
6/3/70	3500	--	--	--	--	--
6/4/70	3500	16_4	16_9	10_1	49	70
6/6/70	3500	14_4	15_1	76	48	67
6/8/70	3500	19_2	16_9	10_3	55	75

Table 20. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	BOD_5 Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% BOD_5 Removal
6/10/70	3500	25_7	24_6	12_6	23	91
6/12/70	3500	21_7	27_0	13_5	37	83
6/15/70	3500	19_2	17_1	43	40	79
6/17/70	2500	18_1	17_7	10_6	33	82
6/19/70	2500	25_3	23_4	11_4	54	79
6/21/70	2500	19_2	16_6	95	49	75
6/23/70	2500	24_3	26_1	14_9	60	75
6/24/70	2500	40_3	22_3	13_4	59	85
6/25/70	2500	16_8	20_3	13_4	79	53
6/28/70	2500	22_2	19_4	44	< 5	> 97
6/30/70	2500	83	12_9	12_3	11	87
7/2/70	2500	88	90	26	33	63
7/3/70	2500	12_0	10_8	41	< 5	> 96

Table 20. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	BOD_5 Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% BOD_5 Removal
7/6/70	1000	23_1	18_6	95	16	93
7/8/70	1000	23_0	23_0	91	22	90
7/11/70	1000	13_4	16_9	42	5	96
7/22/70	1000	21_7	19_6	88	15	93

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 21. COD VALUES OF 24-HOUR COMPOSITE WASTEWATERS SAMPLES
PRETREATMENT PLAIN AERATION
TREATMENT SYSTEM B

Date Samples Composited	Pretreatment Air Flow (cfm)	COD Values (mg/l) of Wastewater Samples*				% COD Removal
		1	2B	3B	7B	
5/19/70	1000	--	--	--	--	--
5/20/70	1000	108_0	107_6	660	208	81
5/24/70	1000	748	600	213	128	83
5/26/70	1000	483	727	357	131	73
5/28/70	1000	806	789	504	133	83
5/29/70	1000	823	788	385	218	74
5/31/70	1000	722	574	225	45	94
6/3/70	3500	--	--	--	--	--
6/4/70	3500	380	320	152	36	91
6/6/70	3500	370	438	144	121	67
6/8/70	3500	538	496	264	77	86
6/10/70	3500	560	149_2	300	112	80

Table 21. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	COD Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% COD Removal
6/13/70	3500	524	956	420	134	74
6/15/70	3500	468	928	188	96	79
6/17/70	2500	488	600	284	88	82
6/19/70	2500	764	980	324	168	78
6/21/70	2500	712	572	252	120	83
6/23/70	2500	748	952	316	116	84
6/24/70	2500	150_2	187_2	768	876	42
6/25/70	2500	556	300	344	132	76
6/28/70	2500	944	772	160	88	91
6/30/70	2500	340	460	355	188	74
7/2/70	2500	428	384	Lost	56	87
7/3/70	2500	296	412	148	124	58
7/6/70	1000	--	--	--	--	--

Table 21. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	COD Values (mg/l) of Wastewater Samples*				% COD Removal
		1	2B	3B	7B	
7/7/70	1000	892	688	200	Lost	--
7/8/70	1000	668	572	258	97	85
7/11/70	1000	824	Lost	211	311	96
7/21/70	1000	367	647	236	101	72
7/22/70	1000	630	839	Lost	66	90

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 22. SUSPENDED SOLIDS LEVELS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY PLAIN AERATION
TREATMENT SYSTEM B

Date Samples Composited	Pretreatment Air Flow (cfm)	SS Levels (mg/l) in Wastewater Samples* 1	2B	3B	7B	% SS Removal
5/19/70	1000	388	--	132	28	95
5/21/70	1000	156	--	112	112	28
5/22/70	1000	156	--	100	72	54
5/23/70	1000	240	--	96	16	93
5/24/70	1000	352	--	100	36	85
5/25/70	1000	452	--	100	56	88
5/26/70	1000	244	--	172	64	74
5/27/70	1000	516	--	176	56	89
5/28/70	1000	380	--	164	32	92
5/29/70	1000	360	--	304	36	90
5/30/70	1000	264	--	88	24	91
5/31/70	1000	148	--	88	36	76

Table 22. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	SS Levels (mg/l) in Wastewater Samples* 1	2B	3B	7B	% SS Removal
6/1/70	1000	248	--	68	8	97
6/2/70	1000	304	--	112	48	84
6/3/70	3500	408	--	120	64	84
6/4/70	3500	184	--	124	60	67
6/5/70	3500	180	--	80	28	84
6/6/70	3500	148	--	56	4	97
6/7/70	3500	224	--	80	76	66
6/8/70	3500	276	--	116	4	98
6/9/70	3500	248	--	128	112	55
6/10/70	3500	260	--	100	56	78
6/11/70	3500	276	--	168	68	75
6/12/70	3500	644	--	128	80	87
6/13/70	3500	224	--	156	40	83

Table 22. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	SS Levels (mg/l) in Wastewater Samples* 1	2B	3B	7B	% SS Removal
6/14/70	3500	544	--	Lost	Lost	--
6/15/70	3500	276	--	56	52	81
6/16/70	3500	640	--	128	64	90
6/17/70	2500	216	--	200	32	85
6/18/70	2500	664	--	584	140	79
6/19/70	2500	532	636	128	52	90
6/20/70	2500	88	--	160	28	68
6/21/70	2500	492	--	52	60	88
6/22/70	2500	356	--	88	16	96
6/23/70	2500	452	--	56	28	93
6/24/70	2500	368	--	80	64	82
6/25/70	2500	964	--	104	52	95
6/26/70	2500	208	--	84	32	84

Table 22. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	SS Levels (mg/l) in Wastewater Samples* 1	2B	3B	7B	% SS Removal
6/27/70	2500	952	--	116	36	96
6/28/70	2500	84	--	80	48	43
6/29/70	2500	432	--	52	12	97
6/30/70	2500	256	--	60	28	89
7/1/70	2500	128	192	88	40	69
7/2/70	2500	288	--	68	40	86
7/3/70	2500	172	--	40	36	79
7/4/70	2500	212	--	44	4	99
7/5/70	2500	304	--	68	32	89
7/6/70	1000	144	--	60	16	89
7/8/70	1000	296	188	96	4	98
7/9/70	1000	404	420	88	56	86
7/10/70	1000	300	524	196	12	96

Table 22. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	SS Levels (mg/l) in Wastewater Samples*				% SS Removal
		1	2B	3B	7B	
7/11/70	1000	480	516	140	116	76
7/21/70	1000	144	208	32	4	97
7/22/70	1000	168	144	100	20	88
7/23/70	1000	324	332	80	28	92
7/24/70	1000	252	404	84	24	91

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 23. HYDROGEN ION CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY PLAIN AERATION
TREATMENT SYSTEM B

Date Samples Composited	Pretreatment Air Flow (cfm)	pH Values of Wastewater Samples* 1	2B	3B	7B
5/19/70	1000	--	--	--	--
5/20/70	1000	7.1	7.2	7.5	7.7
5/21/70	1000	7.1	7.0	7.4	7.3
5/22/70	1000	7.2	7.0	7.4	7.5
5/25/70	1000	7.2	7.0	7.5	7.8
5/26/70	1000	7.2	7.0	7.5	7.7
5/28/70	1000	7.1	7.0	7.4	7.6
6/1/70	1000	7.1	7.2	7.7	7.9
6/2/70	1000	7.2	7.0	7.5	7.8
6/3/70	3500	7.1	7.0	7.4	7.8
6/4/70	3500	7.2	7.1	7.4	7.6
6/5/70	3500	7.2	7.0	7.4	7.6

Table 23. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	pH Values of Wastewater Samples* 1	2B	3B	7B
6/8/70	3500	7.1	7.3	7.6	7.7
6/9/70	3500	7.1	7.2	7.6	7.8
6/10/70	3500	7.0	7.1	7.4_5	7.6
6/11/70	3500	7.0	7.1	7.5	7.7
6/12/70	3500	7.1	7.1	7.4	7.6
6/14/70	3500	7.2	7.7	7.5	7.4
6/16/70	3500	7.2	7.5	7.3	7.3
6/17/70	2500	7.2	7.6	7.4	7.2
6/18/70	2500	7.2	7.2	7.4	7.6
6/19/70	2500	7.3	7.5	7.2	7.2
6/20/70	2500	7.2	7.7	7.4	7.4
6/22/70	2500	7.2	7.4	7.4	7.2
6/23/70	2500	7.2	7.5	7.3	7.2

Table 23. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	pH Values of Wastewater Samples* 1	2B	3B	7B
6/24/70	2500	7.2	7.3	7.4	7.2
6/25/70	2500	8.0	7.4	7.2	7.2
6/26/70	2500	7.4	7.4	7.3	7.2
6/29/70	2500	7.2	7.3	7.7	7.8
6/30/70	2500	7.1	7.1	7.5	7.7
7/1/70	2500	7.1	7.2	7.5	7.7
7/2/70	2500	6.9	7.0	7.4	7.6
7/3/70	2500	6.8	7.0	7.6	7.9
7/6/70	1000	--	--	--	--
7/7/70	1000	6.7	6.8	7.2	7.5
7/8/70	1000	6.6	6.8	7.3	7.5
7/9/70	1000	6.7	6.8	7.3	7.5
7/10/70	1000	6.5	6.6	7.2	7.4

Table 23. continued

Date Samples Composited	Pretreatment Air Flow (cfm)	pH Values of Wastewater Samples* 1	2B	3B	7B
7/21/70	1000	7.2	7.4	7.5	7.7
7/22/70	1000	7.3	7.4	7.4	7.6
7/23/70	1000	7.5	7.5	7.5	7.7
7/24/70	1000	7.5	7.5	7.4	7.6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 24. DISSOLVED OXYGEN CONCENTRATIONS IN WASTEWATERS
PRETREATMENT BY PLAIN AERATION
TREATMENT SYSTEM B

Date	Pretreatment Air Flow (cfm)	DO Concentrations (mg/l) in Wastewaters*						
		1	2B	3B	4B	5B	6B	7B
5/19/70	1000	--	--	--	--	--	--	--
5/20/70	1000	2.1	0.9	0.8	0.4	0.3	0.3	0.4
5/21/70	1000	1.7	2.2	0.5	0.3	0.4	0.4	0.3
5/22/70	1000	1.8	0.6	0.5	0.4	0.3	0.4	0.3
5/25/70	1000	2.0	2.3	0.6	0.2	0.2	0.2	0.4
5/26/70	1000	1.0	1.4	0.4	0.3	0.3	0.2	0.4
5/27/70	1000	1.8	0.6	0.5	0.3	0.4	0.4	0.4
5/28/70	1000	3.0	0.8	0.6	0.3	0.4	0.4	0.4
6/1/70	1000	1.4	0.4	0.4	0.3	0.3	0.4	0.4
6/2/70	1000	2.0	0.8	0.4	0.4	0.4	0.5	0.5
6/3/70	3500	2.0	5.6	0.4	0.3	0.3	0.4	0.4
6/4/70	3500	1.2	3.6	0.0	0.0	0.0	0.0	0.0
6/5/70	3500	2.2	7.4	2.1	0.0	0.0	0.0	0.0

Table 24. continued

Date	Pretreatment Air Flow (cfm)	DO Concentrations (mg/l) in Wastewaters*						
		1	2B	3B	4B	5B	6B	7B
6/8/70	3500	2.3	6.6	1.6	0.2	0.3	0.4	0.1
6/9/70	3500	1.4	4.4	0.1	0.0	0.0	0.1	0.3
6/10/70	3500	1.3	5.0	0.2	0.2	0.2	0.2	0.5
6/11/70	3500	0.9	5.4	0.0	0.0	0.0	0.0	0.1
6/12/70	3500	1.5	4.8	0.0	0.0	0.0	0.0	0.2
6/15/70	3500	1.8	6.2	0.3	0.2	0.3	0.4	0.4
6/16/70	3500	1.7	6.9	0.8	0.1	0.0	0.0	0.8
6/17/70	3500	1.7	7.0	1.0	0.2	0.2	0.2	0.4
6/24/70	3500	1.6	6.9	0.8	0.1	0.1	0.2	0.3
6/25/70	3500	1.1	3.6	0.3	0.1	0.1	0.2	0.4
6/26/70	3500	1.7	2.4	0.4	0.3	0.0_5	0.1	0.3
6/29/70	3500	2.3	5.4	1.3	0.6	0.4	0.5	0.4
6/30/70	3500	1.8	5.5	2.4	0.4	0.5	0.4	0.6

Table 24. continued

Date	Pretreatment Air Flow (cfm)	DO Concentrations (mg/l) in Wastewaters*						
		1	2B	3B	4B	5B	6B	7B
7/1/70	3500	1.8	4.1	0.9	0.2	0.2	0.3	0.4
7/2/70	3500	1.4	4.4	0.8	0.5	0.5	0.8	0.4
7/6/70	1000	1.0	0.7	0.6	0.2	0.5	0.7	0.4
7/7/70	1000	1.0	1.5	0.4	0.5	0.4	0.4	0.7
7/8/70	1000	1.6	1.1	0.7	0.5	0.4	0.4	0.5
7/9/70	1000	1.0	1.2	0.6	0.5	0.5	0.6	0.8
7/10/70	1000	3.9**	4.3	1.1	0.7	0.7	0.7	0.8
7/20/70	1000	0.7	0.9	0.5	0.6	0.7	0.5	0.4
7/21/70	1000	0.8	0.9	0.4	0.6	1.4	1.9	0.7
7/22/70	1000	0.5	1.3	0.6	3.1	1.2	1.5	0.4
7/23/70	1000	1.5	0.2	0.7	1.5	0.6	0.7	--

* See Table on Wastewater Identification Code for Description of Wastewaters.

** High Rainfall on 7/10/70.

Table 25. HYDROGEN SULFIDE CONCENTRATIONS IN WASTEWATERS
PRETREATMENT BY PLAIN AERATION
TREATMENT SYSTEM B

Date	Pretreatment Air Flow (cfm)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters* 1	2B	3B	4B	5B	7B
5/19/70	1000	--	--	--	--	--	--
5/20/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
5/21/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
5/22/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
5/25/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
5/26/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
5/27/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
5/28/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
6/1/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
6/2/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
6/3/70	3500	0.0	0.0	0.0	0.0	0.0	0.0
6/4/70	3500	0.0	0.0	0.0	0.0	0.0	0.0
6/5/70	3500	0.0	0.0	0.0	0.0	0.0	0.0

Table 25. continued

Date	Pretreatment Air Flow (cfm)	Hydrogen Sulfide Concentrations (mg/l) in Wastewater 1	2B	3B	4B	5B	7B
6/6/70	3500	0.0	0.0	0.0	0.0	0.0	0.0
6/8/70	3500	0.0	0.0	0.0	0.0	0.0	0.0
6/9/70	3500	0.0	0.0	0.0	0.0	0.0	0.0
6/10/70	3500	0.0	0.0	0.0	0.0	--	0.0
6/11/70	3500	0.0	0.0	0.0	0.0	0.0	0.0
6/12/70	3500	0.0	0.0	0.0	0.0	0.0	0.0
6/16/70	3500	0.0	0.0	0.0	0.1	0.0	0.0
6/17/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
6/18/70	2500	0.0	0.0	0.0	0.3	0.3	0.0
6/19/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
6/20/70	2500	0.0	0.0	0.0	0.0	0.1	0.0
6/22/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
6/23/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
6/24/70	2500	0.0	0.0	0.0	0.0	0.0	0.0

Table 25. continued

Date	Pretreatment Air Flow (cfm)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters* 1	2B	3B	4B	5B	7B
6/25/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
6/26/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
6/29/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
6/30/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
7/1/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
7/2/70	2500	0.0	0.0	0.0	0.0	0.0	0.0
7/6/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
7/7/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
7/8/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
7/9/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
7/10/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
7/21/70	1000	0.0	0.0	0.0	0.0	0.0	0.0

Table 25. continued

Date	Pretreatment Air Flow (cfm)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters* 1	2B	3B	4B	5B	7B
7/22/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
7/23/70	1000	0.0	0.0	0.0	0.0	0.0	0.0
7/24/70	1000	0.0	0.0	0.0	--	--	0.0

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 26. OXIDATION-REDUCTION POTENTIALS OF WASTEWATERS*
PRETREATMENT BY PLAIN AERATION
TREATMENT SYSTEM B

Date	Pretreatment Air Flow (cfm)	Oxidation-Reduction Potentials (mv) of Wastewaters** 1	2B	3B	4B	5B	6B	7B
5/19/70	1000	--	--	--	--	--	--	--
5/20/70	1000	0	+ 10	+ 10	-185	-130	-125	- 90
6/3/70	3500	--	--	--	--	--	--	--
6/4/70	3500	+135	+ 75	+ 60	-161	-140	- 10	- 90
6/11/70	3500	- 9	- 30	- 40	-171	-157	- 60	-142
6/17/70	2500	+ 30	+ 10	+ 13	-170	-138	--	-140
7/1/70	2500	+ 50	+ 50	+ 51	+ 1	- 9	- 1	+ 2
7/6/70	1000	--	--	--	--	--	--	--
7/11/70	1000	+ 50	+ 39	+ 40	+ 30	+ 29	+ 30	+ 40

* Potentials measured with a saturated calomel electrode, $E_{cal.}$

** See Table on Wastewater Identification Code for Description of Wastewaters.

APPENDIX C

EXPERIMENTAL DATA

PRETREATMENT BY ADDITION OF SODIUM NITRATE AND BY ADDITION OF AMMONIA

Table 27. WASTEWATER FLOWS AND TEMPERATURES PRETREATMENT BY ADDITION OF SODIUM NITRATE AND BY ADDITION OF AMMONIA TREATMENT SYSTEMS A AND B

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
8/18/70	3.8	2.5	6.34	--
8/19/70	3.4	2.6	6.01	69
8/20/70	3.7	2.8	6.48	69
8/21/70	4.1	2.8	6.89	--
8/22/70	3.2	2.7	5.92	--
8/23/70	3.3	2.6	5.93	--
8/24/70	3.9	2.5	6.39	72
8/25/70	3.7	2.5	6.22	70
8/26/70	3.5	2.6	6.12	69
8/27/70	3.5	2.5	6.03	72
8/28/70	3.5	2.5	5.98	70
8/29/70	2.9	2.4	5.31	--
8/30/70	2.4	2.4	4.81	69

Table 27. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
8/31/70	3.8	2.6	6.44	--
9/1/70	3.5	2.5	6.03	69
9/2/70	3.2	2.7	5.88	68
9/3/70	3.3	2.5	5.85	72
9/4/70	3.4	2.4	5.80	72
9/5/70	2.9	2.3	5.17	68
9/6/70	2.3	2.2	4.53	--
9/7/70	2.4	2.4	4.80	--
9/8/70	3.1	2.4	5.53	70
9/9/70	3.1	2.4	5.47	72
9/10/70	3.2	2.5	5.70	73
9/11/70	3.0	2.4	5.39	69
9/12/70	2.7	2.2	4.93	--

Table 27. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
9/13/70	2.1	2.2	4.33	--
9/14/70	3.0	2.3	5.34	70
9/15/70	3.0	2.4	5.38	70
9/16/70	3.0	2.3	5.30	--
9/17/70	2.9	2.5	5.39	72
9/18/70	3.2	2.4	5.60	--
9/19/70	2.6	2.3	4.87	--
9/20/70	2.1	2.1	4.24	--
9/21/70	3.1	2.4	5.51	--
9/22/70	3.1	2.4	5.51	72
9/23/70	3.0	2.4	5.37	72
9/24/70	3.0	2.4	5.35	73
9/25/70	3.2	2.3	5.49	74

Table 27. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
9/26/70	2.4	2.4	4.83	--
9/27/70	2.8	2.4	5.24	--
9/28/70	3.0	2.4	5.45	--
9/29/70	--	2.2	--	--
9/30/70	--	2.4	--	--
10/1/70	2.7	2.2	4.87	--
10/2/70	2.6	2.2	4.78	68
10/3/70	2.3	2.2	4.52	--
10/4/70	1.9	2.2	4.11	--
10/5/70	2.7	2.2	4.90	68
10/6/70	--	2.3	--	69
10/7/70	--	2.2	--	69
10/8/70	2.6	2.4	4.97	68

Table 27. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A*	System B	Total	
10/9/70	2.6	2.3	4.87	69
10/10/70	2.2	2.2	4.43	--
10/11/70	1.9	2.2	4.09	--
10/12/70	2.3	2.5	4.82	70
10/13/70	2.4	2.5	4.90	69
10/14/70	2.5	2.3	4.75	69
10/15/70	2.9	2.2	5.11	70

* System A flows were derived by subtracting System B flows from Total flows since System A has no flow meter for direct flow measurement.

Table 28. BOD_5 VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF SODIUM NITRATE
TREATMENT SYSTEM A

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples*				% BOD_5 Removal
		1	2A	3A	7A	
8/18/70	250	15_1	13_5	16_5	47	69
8/20/70	250	27_7	23_9	21_7	57	79
8/23/70	250	15_7	20_2	18_0	43	73
8/25/70	250	25_7	22_5	30_7	55	79
8/28/70	250	20_9	18_7	11_2	24	89
8/30/70	250	29_1	33_3	20_6	45	85
9/2/70	500	28_9	31_2	28_2	66	77
9/3/70	500	31_7	40_9	35_0	53	83
9/6/70	500	95	25_9	20_7	58	39
9/8/70	500	40_5	34_5	45_2	63	84
9/9/70	500	19_9	33_4	28_1	80	60
9/11/70	500	40_9	39_9	29_9	110	73

Table 28. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples*				% BOD_5 Removal
		1	2A	3A	7A	
9/15/70	1000	34_3	40_0	41_0	82	76
9/18/70	1000	28_5	40_4	23_5	47	84
9/20/70	1000	63	24_6	16_4	31	51
9/22/70	1000	14_8	32_3	20_0	39	74
9/24/70	1000	22_4	27_2	24_1	48	79
9/25/70	1000	10_5	17_0	18_0	46	56
9/27/70	1000	13_4	27_4	17_7	31	77
9/29/70	2000	33_8	34_0	25_8	30	91
10/1/70	2000	16_8	39_8	37_5	30	82
10/3/70	2000	52_8	53_8	13_1	64	
10/5/70	2000	39_5	45_5	30_5	40	90
10/10/70	2000	39_8	59_5	41_5	105	74

Table 28. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples*				% BOD_5 Removal
		1	2A	3A	7A	
10/12/70	-0-	34_4	68_9	48_9	59	83
10/14/70	-0-	27_6	64_6	61_9	44	84

* See Table on Wastewater Identification Code for Description of Wastewaters.

** Addition of Sodium Nitrate Discontinued at 1600 hours on 10/2/70.

Table 29. COD VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF SODIUM NITRATE
TREATMENT SYSTEM A

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples*				% COD Removal
		1	2A	3A	7A	
8/18/70	250	107_2	180_3	714	346	68
8/20/70	250	127_7	115	597	362	72
8/23/70	250	635	661	693	266	58
8/25/70	250	875	890	884	160	82
8/27/70	250	968	888	102_4	196	80
8/28/70	250	137_0	124_9	823	165	88
8/30/70	250	128_4	104_0	984	146	89
9/2/70	500	113_9	103_8	846	163	86
9/3/70	500	121_4	145_6	137_7	188	85
9/6/70	500	642	115_9	102_4	152	76
9/8/70	500	520	536	134_2	171	67
9/9/70	500	870	111_2	112_0	261	70

Table 29. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples*				% COD Removal
		1	2A	3A	7A	
9/11/70	500	140_2	150_6	115_4	264	81
9/14/70	500	164_4	190_0	--	--	--
9/15/70	1000	122_4	130_4	197_6	228	81
9/18/70	1000	796	247_2	177_6	105	87
9/20/70	1000	338	925	898	137	59
9/22/70	1000	456	148_0	929	158	65
9/24/70	1000	114_4	145_2	133_6	204	82
9/25/70	1000	379	568	778	176	54
9/27/70	1000	367	128_6	934	139	62
9/29/70	2000	688	128_8	117_2	191	72
10/1/70	2000	508	770	767	338	33
10/3/70	2000	188_6	188_2	525	188	90
10/5/70	2000	146_7	194_5	140_6	163_7	- 1.2

Table 29. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples*				% COD Removal
		1	2A	3A	7A	
10/8/70	8**	180_4	297_6	395_9	160	91
10/10/70	2000	164_2	368_9	250_8	182	89
10/12/70	-0-***	117_2	414_7	307_2	180	84
10/14/70	-0-	139_6	906_3	475_0	167	88

* See Table on Wastewater Identification Code for Description of Wastewaters.

** Decreased from 2000 to 8 lbs/day at 1500 hours.

*** Addition of Sodium Nitrate Discontinued at 1600 hours on 10/14/70.

Table 30. SUSPENDED SOLIDS LEVELS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY THE ADDITION OF SODIUM NITRATE TREATMENT SYSTEM A

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2A	3A	7A	
8/18/70	250	184	260	368	20	89
8/20/70	250	208	500	488	28	86
8/21/70	250	272	384	280	12	92
8/22/70	250	288	480	608	20	93
8/23/70	250	340	448	440	0	100
8/24/70	250	388	420	412	0	100
8/25/70	250	444	456	388	16	91
8/26/70	250	400	528	500	40	90
8/27/70	250	568	536	576	4	89
8/28/70	250	828	800	404	16	98
8/29/70	250	810	732	572	24	97
8/30/70	250	728	772	400	8	99

Table 30. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2A	3A	7A	
8/31/70	500	410_0	402_0	640	4	98
9/1/70	500	676	342_0	624	32	95
9/2/70	500	770	620	420	40	95
9/3/70	500	600	670	350	20	97
9/4/70	500	400	850	760	32	92
9/5/70	500	890	320	550	36	96
9/6/70	500	104	836	672	40	61
9/8/70	500	360	332	892	96	73
9/9/70	500	104	292	840	32	69
9/10/70	500	310	610	550	12	96
9/11/70	500	320	310	123_0	8	98
9/12/70	500	840	900	820	90	89
9/13/70	500	127_0	880	108_0	100	94

Table 30. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2A	3A	7A	
9/14/70	1000	106_0	120_0	--	--	--
9/15/70	1000	107_0	590	109_0	32	94
9/16/70	1000	610	710	120_0	40	93
9/17/70	1000	700	910	930	36	95
9/19/70	1000	320	460	480_0	44	86
9/20/70	1000	101_0	820	120_0	36	96
9/21/70	1000	136_0	740	540	8	97
9/22/70	1000	650	910	490	20	97
9/23/70	1000	200	500	430	28	86
9/24/70	1000	430	800	660	20	96
9/25/70	1000	490	800	770	32	93
9/26/70	1000	320	260	410	52	84
9/27/70	1000	470	580	550	32	93

Table 30. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2A	3A	7A	
9/28/70	2000	670	880	620	56	96
9/29/70	2000	840	920	830	80	91
9/30/70	2000	590	730	670	32	94
10/1/70	2000	1160	900	860	44	89
10/2/70	2000	550	970	950	52	90
10/3/70	2000	990	1330	830	48	95
10/4/70	2000	1640	1570	410	44	97
10/5/70	2000	510	1960	590	32	93
10/6/70	2000	880	1430	800	16	98
10/7/70	2000	1090	1440	700	20	98
10/8/70	8	860	4930	2750	36	96
10/9/70	8	910	3680	1210	76	92
10/10/70	2000	1310	3020	1810	16	98

Table 30. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2A	3A	7A	
10/11/70	2000	1000	5420	2090	8	99
10/12/70	-0-	640	6220	2970	32	95
10/13/70	-0-	860	3660	2840	24	97
10/15/70	-0-	3660	2920	2560	28	99

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 31. ORGANIC NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF SODIUM NITRATE TREATMENT SYSTEM A

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples*			
		1	2A	3A	7A
8/21/70	250	1.4	1.7	1.9	4.5
8/24/70	250	2.8	5.6	6.5	2.4
8/27/70	250	5.3	4.4	4.7	2.0
8/30/70	250	4.5	4.7	5.1	2.3
8/2/70	500	4.5	3.7	4.5	1.0
9/8/70	500	6.3	3.2	4.0	1.6
9/9/70	500	3.4	2.3	5.9	0.4
9/11/70	500	0.6	0.8	4.9	0.0
9/18/70	1000	4.2	7.2	5.2	0.7
9/20/70	1000	6.5	3.7	2.7	0.0
9/23/70	1000	2.1	3.4	2.1	1.0
9/28/70	2000	0.1	2.5	2.8	0.7

Table 31. continued

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples*			
		1	2A	3A	7A
9/29/70	2000	1.6	4.7	4.3	0.8
10/2/70	2000	0.6	3.4	4.0	0.0
10/6/70	2000	4.4	9.4	3.0	0.2
10/8/70	8	62.0	14.7	12.5	1.0
10/11/70	2000	7.2	0.2	11.8	0.6
10/13/70	-0-	7.3	20.8	14.5	0.8
10/15/70	-0-	1.4	10.3	5.6	0.6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 32. AMMONIA NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF SODIUM NITRATE TREATMENT SYSTEM A

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples*			
		1	2A	3A	7A
8/21/70	250	9.0	9.4	9.4	12.5
8/24/70	250	12.5	11.8	13.2	12.5
8/27/70	250	15.7	12.2	15.4	10.7
8/30/70	250	14.7	13.3	13.8	10.7
9/2/70	500	13.9	13.2	12.6	1.2
9/8/70	500	21.0	14.8	15.7	14.8
9/9/70	500	14.1	13.7	14.6	13.6
9/11/70	500	11.3	9.8	13.4	13.6
9/18/70	1000	13.6	13.7	12.1	11.8
9/20/70	1000	10.1	17.4	12.9	11.8
9/23/70	1000	10.7	14.3	11.4	9.2
9/28/70	1000	11.4	13.2	13.8	10.2

Table 32. continued

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples*			
		1	2A	3A	7A
9/29/70	2000	11.4	17.2	16.9	13.8
10/2/70	2000	13.9	19.3	21.6	17.7
10/6/70	2000	16.1	21.9	17.9	17.9
10/8/70	8	22.5	17.6	14.7	14.2
10/11/70	2000	18.9	23.5	17.4	15.5
10/13/70	-0-	15.9	17.6	17.9	14.8
10/15/70	-0-	18.7	17.6	16.3	14.6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 33. NITRITE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF SODIUM NITRATE TREATMENT SYSTEM A

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Wastewater Samples*			
		1	2A	3A	7A
8/20/70	250	0.00_2	0.20	0.05	0.01
8/21/70	250	0.00	0.00_3	0.00	0.09
8/24/70	250	0.00_5	0.52_5	0.22_5	0.37_5
8/26/70	250	0.00_8	0.00	0.00	0.00_9
8/27/70	250	0.01	0.00	0.00	0.00_6
8/28/70	250	0.00_3	0.02_1	0.00_7	0.00_6
8/30/70	250	0.03	0.02	0.00	0.11
9/2/70	500	0.02_1	0.01_2	0.00_1	0.01
9/3/70	500	0.02	0.12	0.00	0.00_4
9/5/70	500	0.00	0.00	0.00	0.00_4
9/7/70	500	0.00_7	0.77_5	0.15	0.19
9/8/70	500	0.01_6	0.01_1	0.00_7	0.00_8

Table 33. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Wastewater Samples*			
		1	2A	3A	7A
9/9/70	500	0.00_8	0.00	0.00_5	0.01_5
9/11/70	500	0.02	0.00_4	0.00	0.00_5
9/13/70	500	0.00_5	0.00_7	0.00_4	0.00_3
9/14/70	1000	8.0	13.0	--	--
9/15/70	1000	0.02	0.00	0.01	0.01_5
9/18/70	1000	0.00_9	0.00_7	0.00_5	0.01_1
9/19/70	1000	0.00_5	0.00_6	0.00_6	0.01_3
9/20/70	1000	0.10	0.00_2	0.07_5	0.13
9/21/70	1000	0.00_2	0.04	0.05_5	0.02_4
9/23/70	1000	0.01_8	0.01_5	0.00_9	0.00_7
9/25/70	1000	0.00_9	0.00_9	0.00_6	0.01_2
9/28/70	2000	0.00_5	0.50	0.50	0.12
9/29/70	2000	0.01_5	0.37_5	0.00_5	0.50

Table 33. continued

Date Samples Composited	Sodium Nitrate Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Wastewater Samples*			
		1	2A	3A	7A
10/1/70	2000	0.00_6	0.62_5	0.06	0.15
10/2/70	2000	0.01_2	0.00_8	0.00_5	0.32
10/3/70	2000	0.00_4	0.01_8	0.01_6	0.03_8
10/5/70	2000	0.01_1	0.57_5	0.65_0	0.07_5
10/7/70	2000	0.00_1	0.01_1	0.00_5	0.50
10/8/70	8	0.00_5	0.00_6	0.00_5	0.25
10/9/70	8	0.00_6	0.00_6	0.00_2	0.02
10/11/70	2000	0.00_4	0.00_6	0.01	0.03_5
10/13/70	-0-	0.00_8	0.00_5	0.03	0.00_6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 34. NITRITE PLUS NITRATE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF SODIUM NITRATES TREATMENT SYSTEM A

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentrations (mg/l) in Samples*			
		1	2A	3A	7A
8/20/70	250	0.00	0.12	0.02	0.02
8/21/70	250	0.00	0.00	0.04	0.06
8/24/70	250	0.02	3.25	--	--
8/26/70	250	0.01_2	0.00_2	0.00_6	0.00_6
8/27/70	250	0.00_5	0.00_3	0.00	0.00_6
8/28/70	250	0.05	0.00	0.01	0.06
8/30/70	250	0.02	0.01	0.00_4	0.35
9/1/70	500	0.00_8	0.20	0.00_5	0.10
9/2/70	500	0.4	2.0	0.12	0.00_6
9/3/70	500	0.12	0.16	0.10	0.00_4
9/7/70	500	0.00_4	4.75	0.15	0.80
9/8/70	500	0.02	0.02	0.01_2	0.00_7

Table 34. continued

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentrations (mg/l) in Samples*			
		1	2A	3A	7A
9/9/70	500	0.00_9	0.00	0.21	0.85
9/11/70	500	0.00_2	0.01	0.00_4	0.00
9/13/70	500	0.00_2	0.00_2	0.00_6	0.00_6
9/14/70	1000	0.00	0.00	--	--
9/15/70	1000	0.10_3	0.00	0.02	0.01
9/18/70	1000	0.06	0.01	0.08	0.07
9/19/70	1000	0.10	0.09	0.07	0.06
9/20/70	1000	0.12	0.08	0.37	0.48
9/21/70	1000	0.06	0.12	0.20	0.11
9/23/70	1000	0.13	0.09	0.07	0.04
9/25/70	1000	0.10	0.07	0.09	0.08
9/28/70	2000	0.08	5.50	3.25	0.48
9/29/70	2000	0.12	0.37_5	0.00	0.50
10/1/70	2000	0.05	7.50	0.06	0.62

Table 34. continued

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentrations (mg/l) in Samples*			
		1	2A	3A	7A
10/2/70	2000	0.11	0.08	0.06	0.32
10/5/70	2000	0.08	11.7_5	8.00	7.50
10/7/70	2000	0.08	0.08	0.07	2.25
10/8/70	8	0.06	0.04	0.08	1.25
10/9/70	8	0.06	0.04	0.02	0.06
10/11/70	2000	0.10	0.08	0.06	0.16
10/13/70	-0-	0.08	0.05	0.06	0.05

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 35. DISSOLVED OXYGEN CONCENTRATIONS IN WASTEWATERS
PRETREATMENT BY ADDITION OF SODIUM NITRATE
TREATMENT SYSTEM A

Date	Sodium Nitrate Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters*											
		1	2A	3A	4A11	4A12	4A21	4A22	5A1	5A2	6A1	6A2	7A
8/19/70	250	0.6	0.9	0.5	0.6	0.5	0.6	0.6	0.5	0.7	2.4	2.7	0.5
8/20/70	250	1.3	0.7	0.6	0.8	0.7	0.5	0.6	0.4	0.7	1.6	1.6	0.7
8/24/70	250	0.6	0.7	0.4	0.5	0.5	0.6	0.6	0.4	0.4	2.4	2.7	0.6
8/25/70	250	0.4	0.8	0.4	0.6	0.5	0.4	0.4	0.5	0.4	0.6	0.6	0.6
8/26/70	250	0.5	0.6	0.5	0.4	0.5	0.4	0.4	0.4	2.0	0.8	1.8	0.4
8/27/70	250	0.3	0.7	0.7	0.5	0.4	0.4	0.4	0.4	1.0	1.2	1.4	0.5
8/28/70	250	0.8	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.9	0.8	0.9	0.4
8/31/70	250	0.6	0.6	0.4	0.5	0.4	0.4	0.4	0.4	2.7	3.6	4.4	0.5
9/1/70	500	0.8	0.5	0.5	0.5	0.7	0.4	0.5	0.4	0.5	0.8	0.9	0.5
9/2/70	500	0.5	0.4	0.6	0.5	0.4	0.4	0.5	0.4	0.4	0.8	0.8	0.5
9/3/70	500	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.5
9/4/70	500	0.4	0.4	0.5	0.5	0.3	0.4	0.4	0.4	0.5	1.3	1.2	0.4

Table 35. continued

Date	Sodium Nitrate Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters*											
		1	2A	3A	4A11	4A12	4A21	4A22	5A1	5A2	6A1	6A2	7A
9/5/70	500	1.6	0.5	0.6	0.4	0.5	0.4	0.4	0.4	3.0	3.8	4.0	0.3
9/8/70	500	0.8	0.6	0.5	0.5	0.4	0.3	0.4	0.4	0.6	0.5	0.8	0.3
9/9/70	500	0.7	0.6	0.5	0.5	0.4	0.4	0.6	0.4	0.5	0.7	0.7	0.4
9/10/70	500	0.4	0.4	0.4	0.5	0.1	0.4	0.3	0.3	0.3	0.5	0.5	0.4
9/11/70	500	0.4	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.3	0.4	0.4	0.4
9/14/70	1000	0.3	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.5	1.6	1.8	0.5
9/15/70	1000	0.6	0.8	0.9	0.5	0.3	0.3	0.4	0.5	0.5	0.4	0.4	0.4
9/16/70	1000	0.4	0.6	0.6	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.5	0.3
9/17/70	1000	0.3	0.3	0.4	0.3	0.4	0.2	0.2	0.4	0.7	0.5	0.6	0.3
9/22/70	1000	0.4	0.5	0.5	0.3	0.4	0.4	0.4	0.4	1.4	2.9	3.6	0.5
9/23/70	1000	0.9	0.8	0.4	0.4	0.4	0.4	0.4	0.4	1.8	2.4	3.0	0.5
9/24/70	1000	0.4	0.4	0.5	0.4	0.4	0.3	0.5	0.5	0.5	1.4	1.8	0.4
9/25/70	1000	0.4	0.9	0.4	0.5	0.4	0.4	0.3	0.5	0.6	2.6	3.0	0.5

Table 35. continued

Date	Sodium Nitrate Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters*											
		1	2A	3A	4A11	4A12	4A21	4A22	5A1	5A2	6A1	6A2	7A
10/2/70	2000	0.5	0.7	0.9	0.5	0.4	0.3	0.4	0.5	0.4	1.3	2.7	0.6
10/5/70	2000	0.5	1.6	0.6	0.7	0.6	0.7	0.7	0.7	0.6	1.2	1.5	1.4
10/6/70	2000	0.6	0.4	0.7	0.4	0.5	0.5	0.5	0.6	0.6	1.7	1.7	1.5
10/7/70	2000	1.6	0.8	0.7	0.4	0.5	0.5	0.5	0.5	0.6	1.0	1.4	1.7
10/8/70	8	1.3	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.7	0.8	1.4
10/9/70	8	1.3	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.9	1.4
10/12/70	-0-	0.8	1.2	0.7	0.5	0.4	0.5	0.4	0.4	0.5	0.5	1.4	0.5
10/13/70	-0-	0.4	1.3	0.7	0.5	0.4	0.3	0.5	0.4	1.5	0.5	2.8	0.5
10/14/70	-0-	0.6	1.0	0.5	0.6	0.7	0.5	0.6	0.6	5.6	0.8	5.6	0.5
10/15/70	-0-	1.5	0.9	0.6	0.6	0.5	0.6	0.6	0.6	5.6	0.8	6.4	0.4

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 36. HYDROGEN SULFIDE CONCENTRATIONS IN WASTEWATERS
PRETREATMENT BY ADDITION OF SODIUM NITRATE
TREATMENT SYSTEM A

Date	Sodium Nitrate Feed Rate (lbs/day)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*							
		1	2A	3A	4A12	4A22	5A1	5A2	7A
8/18/70	250	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
8/20/70	250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8/21/70	250	0.0	0.0	0.0	0.5	0.3	0.1	0.0	0.0
8/22/70	250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8/24/70	250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8/27/70	250	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
8/28/70	250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/1/70	500	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
9/2/70	500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/3/70	500	0.0	0.0	0.0	0.4	0.1	0.5	0.0	0.0
9/4/70	500	0.0	0.0	0.0	0.4	0.3	0.5	0.0	0.0
9/8/70	500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 36. continued

Date	Sodium Nitrate Feed Rate (lbs/day)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*							
		1	2A	3A	4A12	4A22	5A1	5A2	7A
9/10/70	500	0.0	0.0	0.3	1.0	1.0	0.1	0.0	0.1
9/11/70	500	0.0	0.0	0.0	3.0	0.4	0.3	0.1	0.1
9/14/70	500	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
9/15/70	1000	0.0	0.0	0.1	0.3	4.0	0.0	0.0	0.1
9/16/70	1000	0.0	0.0	0.0	5.0	2.0	2.0	0.0	0.0
9/17/70	1000	0.0	0.0	2.0	2.0	0.3	5.0	0.0	0.0
9/18/70	1000	0.0	0.0	0.0	0.4	0.3	0.5	0.0	0.0
9/21/70	1000	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
9/22/70	1000	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
9/23/70	1000	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/24/70	1000	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/25/70	1000	0.2	0.0	0.0	2.0	0.4	0.4	0.0	0.0
9/28/70	1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 36. continued

Date	Sodium Nitrate Feed Rate (lbs/day)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*							
		1	2A	3A	4A12	4A22	5A1	5A2	7A
9/29/70	2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9/30/70	2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/1/70	2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/2/70	2000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
10/5/70	2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/6/70	2000	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
10/7/70	2000	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
10/12/70	-0-**	0.0	0.0	0.0	2.0	0.0	0.3	0.0	0.0
10/13/70	-0-	0.0	0.0	0.4	3.0	0.0	0.2	0.0	0.0
10/14/70	-0-	0.1	0.0	0.3	0.4	1.0	0.0	0.0	0.0
10/15/70	-0-	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0

* See Table on Wastewater Identification Code for Description of Wastewaters.

** Addition of Sodium Nitrate Discontinued at 1600 hours on 10/12/70.

Table 37. HYDROGEN ION CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF SODIUM NITRATE TREATMENT SYSTEM A

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	pH Values of Wastewater Samples*			
		1	2A	3A	7A
8/18/70	250	7.2	7.2	7.3	7.5
8/20/70	250	7.0	7.2	7.2	7.3
8/21/70	250	7.2	7.3	7.2	7.4
8/22/70	250	7.4	3.4	7.4	7.4
8/25/70	250	7.0	7.3	7.4	7.4
8/27/70	250	7.1	7.3	7.3	7.4
8/28/70	250	6.9	7.2	7.4	7.4
8/31/70	250	7.0	7.3	7.4	7.5
9/1/70	500	7.1	7.4	7.4	7.4
9/2/70	500	7.0	7.2	7.2	7.4
9/3/70	500	7.0	7.2	7.2	7.3
9/4/70	500	6.9	7.2	7.1	7.4

Table 37. continued

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	pH Values of Wastewater Samples*			
		1	2A	3A	7A
9/5/70	500	7.1	7.4	7.3	7.5
9/8/70	500	7.0	7.2	7.3	7.4
9/9/70	500	7.1	7.3	7.2	7.3
9/10/70	500	7.0	7.1	7.1	7.3
9/11/70	500	7.0	7.1	7.2	7.4
9/12/70	500	7.2	6.9	7.2	7.3
9/13/70	500	6.8	7.0	--	--
9/15/70	1000	6.4	6.7	7.0	7.1
9/16/70	1000	6.7	6.9	7.0	7.2
9/17/70	1000	6.5	6.8	6.9	7.0
9/18/70	1000	6.8	6.9	6.9	7.1
9/22/70	1000	6.7	6.8	7.0	7.0
9/23/70	1000	6.5	6.8	6.9	7.0

Table 37. continued

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	pH Values of Wastewater Samples*			
		1	2A	3A	7A
9/24/70	1000	6.4	6.7	6.9	7.0
9/25/70	1000	6.8	6.9	6.9	7.0
9/28/70	1000	6.8	7.0	7.1	7.2
9/29/70	2000	6.9	7.0	7.1	7.2
9/30/70	2000	6.8	6.9	7.0	7.1
10/1/70	2000	6.9	7.1	7.0	7.2
10/2/70	2000	6.9	7.1	7.0	7.3
10/5/70	2000	6.6	7.0	7.1	7.2
10/6/70	2000	6.8	6.9	7.0	7.1
10/7/70	2000	6.7	7.0	7.0	7.2
10/12/70	-0-**	6.8	6.9	7.1	7.3

Table 37. continued

Date Samples Collected	Sodium Nitrate Feed Rate (lbs/day)	pH Values of Wastewater Samples*			
		1	2A	3A	7A
10/13/70	-0-	6.8	7.0	6.9	7.2
10/15/70	-0-	7.0	7.0	6.9	7.2

* See Table on Wastewater Identification Code for Description of Wastewaters.

** Addition of Sodium Nitrate Discontinued at 1600 hours on 10/12/70.

Table 38. BOD_5 VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF AMMONIA
TREATMENT SYSTEM B

Date Samples Composited	Ammonia Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples*				% BOD_5 Removal
		1	2B	3B	7B	
8/18/70	30	15_1	17_5	93	19	87
8/20/70	30	27_7	24_7	11_7	16	94
8/23/70	30	15_7	21_7	4_7	30	81
		(88)	(51)	(59)	(35)	--
8/25/70	30	25_7	33_2	13_8	40	86
8/28/70	30	20_9	19_4	36	5	98
8/30/70	30	29_1	20_3	61	40	86
9/2/70	60	28_9	34_1	13_8	18	94
9/3/70	60	31_7	43_9	62	15	95
		(12_5)	(86)	(116)	(18)	--
9/6/70	60	95	24_4	54	12	87
9/8/70	60	40_5	33_0	11_7	38	91

Table 38. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% BOD_5 Removal
9/9/70	60	19_9	51_4	22_1	21	89
		(70)	(76)	(53)	(43)	--
9/11/70	60	40_9	39_9	19_9	91	78
9/15/70	120	34_3	34_7	15_0	33	90
		(18_9)	(13_4)	(11_0)	(24)	--
9/18/70	120	28_5	53_9	25_8	50	82
9/20/70	120	63	24_9	63	18	71
9/22/70	120	14_8	30_5	11_5	55	63
9/24/70	120	22_4	31_6	13_6	10	96
		(15_9)	(81)	(15_3)	(22)	--
9/25/70	120	10_5	17_3	11_5	27	74
9/27/70	120	13_4	22_0	68	21	84
9/29/70	240	33_8	37_0	15_8	8	98

Table 38. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% BOD_5 Removal
10/1/70	240	16_8	40_3	33_3	11	93
		(93)	(96)	(15_8)	(20)	--
10/3/70	240	52_8	39_1	14_5	16	97
10/5/70	240	39_5	35_8	26_8	6	98
10/10/70	240	39_8	26_3	25_3	39	90
10/12/70	-0-**	34_4	32_1	12_9	37	89
10/14/70	-0-	27_6	37_1	23_9	42	85
		(88)	(11_2)	(15_7)	(39)	--

* See Table on Wastewater Identification Code for Description of Wastewaters.

() BOD_5 Value of Filtered Sample.

** Addition of Ammonia was discontinued at 1200 hours on 10/12/70.

Table 39. COD VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY THE ADDITION OF AMMONIA TREATMENT SYSTEM B

Date Samples Composited	Ammonia Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples*				% COD Removal
		1	2B	3B	7B	
8/18/70	30	107_2	118_6	585	166	85
8/20/70	30	127_7	72	580	179	86
8/23/70	30	635	685	327	138	78
		(355)	(273)	(250)	(105)	--
8/25/70	30	875	932	343	84	90
8/27/70	30	968	816	296	100	90
		(404)	(148)	(168)	(84)	--
8/28/70	30	137_0	124_9	248	39	97
8/30/70	30	128_4	114_9	480	43	97
9/2/70	60	113_9	164_1	349	58	95
9/3/70	60	121_4	157_0	444	60	95
		(268)	(188)	(228)	(52)	--

Table 39. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% COD Removal
9/6/70	60	642	110_6	262	44	93
9/8/70	60	520	552	364	48	91
9/9/70	60	872	1824	880	136	84
		(219)	(188)	(221)	--	--
9/11/70	60	140_2	143_2	312	414	70
9/14/70	120	164_4	188_0	--	--	--
9/15/70	120	122_4	139_2	512	20	98
		(368)	(240)	(200)	(72)	--
9/18/70	120	796	--	532	167	79
9/20/70	120	338	122_0	208	130	62
9/22/70	120	456	146_8	518	138	70
9/24/70	120	114_4	142_4	424	96	92
		(288)	(154)	(172)	(63)	78

Table 39. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples* 1	2B	3B	7B	% COD Removal
9/25/70	120	379	608	296	104	73
9/27/70	120	367	132_5	276	63	83
9/29/70	240	688	139_2	488	72	90
10/1/70	240	508	651	179	152	33
		(466)	(481)	(590)	(114)	--
10/3/70	240	188_6	151_2	639	574	70
10/5/70	240	146_7	161_8	957	98	93
10/8/70	240	180_4	203_9	748	142	92
		(195)	(216)	(291)	(72)	--
10/10/70	240	164_2	105_5	448	174	89
10/12/70	-0-**	111_7	450_4	--	229	79

Table 39. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples*				% COD Removal
		1	2B	3B	7B	
10/14/70	-0-	139_6	182_4	675	102	93

* See Table on Wastewater Identification Code for Description of Wastewaters.

() COD Value of filtered sample.

** Addition of Ammonia was discontinued at 1200 hours on 10/12/70.

Table 40. SUSPENDED SOLIDS LEVELS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY THE ADDITION OF AMMONIA
TREATMENT SYSTEM B

Date Samples Composited	Ammonia Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2B	3B	7B	
8/18/70	30	184	260	52	4	98
8/20/70	30	208	528	80	28	86
8/21/70	30	272	388	56	0	100
8/22/70	30	288	472	84	12	96
8/23/70	30	340	468	48	0	100
8/24/70	30	388	444	40	4	99
8/25/70	30	444	448	56	0	100
8/26/70	30	400	532	80	32	92
8/27/70	30	568	544	60	4	96
8/28/70	30	828	568	60	12	98
8/29/70	30	810	428	56	4	99
8/30/70	30	728	764	20	0	100

Table 40. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2B	3B	7B	
8/31/70	60	410_0	800	32	0	100
9/1/70	60	676	628	60	0	100
9/2/70	60	770	120_0	190	16	98
9/3/70	60	600	800	108	0	100
9/4/70	60	400	670	164	12	97
9/5/70	60	890	500	40	72	92
9/6/70	60	104	800	132	16	85
9/8/70	60	360	316	96	0	100
9/9/70	60	104	240	188	12	89
9/10/70	60	310	1620	360	0	100
9/11/70	60	320	490	108	16	95
9/12/70	60	840	630	100	132	84
9/13/70	60	127_0	112_0	110	332	73

Table 40. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2B	3B	7B	
9/14/70	120	106_0	117_0	--	--	--
9/15/70	120	107_0	660	240	24	98
9/16/70	120	610	730	220	44	92
9/17/70	120	700	860	300	20	97
9/19/70	120	320	560	250	128	97
9/20/70	120	101_0	780	32	48	95
9/21/70	120	136_0	840	40	68	95
9/22/70	120	650	850	210	20	97
9/23/70	120	200	580	300	52	74
9/24/70	120	430	700	120	8	98
9/25/70	120	490	770	130	28	94
9/26/70	120	320	300	110	32	90
9/27/70	120	470	550	110	16	97

Table 40. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2B	3B	7B	
9/28/70	120	670	820	140	32	95
9/29/70	240	840	910	170	40	95
9/30/70	240	590	700	130	12	98
10/1/70	240	1160	900	170	52	95
10/2/70	240	550	930	180	28	95
10/3/70	240	990	2010	596	36	96
10/4/70	240	1640	1100	380	32	97
10/5/70	240	510	930	572	20	96
10/6/70	240	880	1000	470	27	97
10/7/70	240	1090	1160	560	24	97
10/8/70	240	860	1350	360	100	88
10/9/70	240	910	1270	340	44	95
10/10/70	240	1310	670	168	36	97

Table 40. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples*				% SS Removal
		1	2B	3B	7B	
10/11/70	210	1000	2660	60	12	98
10/12/70	-0-	640	1300	300	20	97
10/13/70	-0-	860	1570	2440	68	92
10/15/70	-0-	3660	2920	2880	44	98

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 41. ORGANIC NITROGEN CONCENTRATIONS IN 24-HOUR WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF AMMONIA
TREATMENT SYSTEM B

Date Samples Collected	Ammonia Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples*			
		1	2B	3B	7B
8/21/70	30	1.4	1.4	1.1	1.6
8/24/70	30	2.8	5.7	3.0	1.4
8/27/70	30	5.3	3.8	2.0	0.8
8/30/70	30	4.5	9.0	2.1	1.9
9/2/70	60	4.5	6.5	1.7	0.3
9/8/70	60	6.3	3.7	2.7	1.0
9/9/70	60	3.4	1.6	2.0	0.0
9/11/70	60	0.6	1.1	0.0	0.0
9/18/70	120	4.2	18.0	4.2	0.3
9/20/70	120	6.5	--	1.4	4.9
9/23/70	120	2.1	2.3	2.4	0.0
9/28/70	120	1.0	2.7	1.4	0.8

Table 41. continued

Date Samples Collected	Ammonia Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples*			
		1	2B	3B	7B
9/29/70	240	1.6	4.5	1.6	1.Q
10/2/70	240	0.6	2.3	1.0	0.0
10/6/70	240	4.4	5.3	2.3	0.0
10/8/70	240	62.0	5.2	6.3	0.6
10/11/70	210	7.2	1.1	1.2	0.0
10/13/70	-0-	7.3	7.8	11.8	0.0
10/15/70	-0-	1.4	11.8	6.0	0.6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 42. AMMONIA NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF AMMONIA TREATMENT SYSTEM B

Date Samples Collected	Ammonia Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples*			
		1	2B	3B	7B
8/21/70	30	9.0	9.7	10.5	10.9
8/24/70	30	12.5	11.5	12.5	5.0
8/27/70	30	15.7	10.4	12.3	6.5
8/30/70	30	14.7	12.1	9.8	5.4
9/2/70	60	13.9	12.0	10.9	1.7
9/8/70	60	21.0	13.7	13.3	11.4
9/9/70	60	14.1	12.3	12.9	4.3
9/11/70	60	11.3	12.1	9.0	10.1
9/18/70	120	13.6	9.1	9.2	9.3
9/20/70	120	10.1	9.4	8.3	9.0
9/23/70	120	10.7	6.8	9.6	6.9
9/28/70	120	11.4	16.1	12.8	12.7

Table 42. continued

Date Samples Collected	Ammonia Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples*			
		1	2B	3B	7B
9/29/70	240	11.4	14.6	13.7	12.2
10/2/70	240	13.9	15.6	15.3	12.6
10/6/70	240	16.1	12.3	13.3	13.8
10/8/70	240	22.5	17.6	14.7	14.2
10/11/70	240	18.9	23.5	17.4	15.5
10/13/70	-0-	15.9	13.4	19.3	13.7
10/15/70	-0-	18.7	14.7	15.2	15.6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 43. NITRITE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY THE ADDITION OF AMMONIA TREATMENT SYSTEM B

Date Samples Composited	Ammonia Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Wastewater Samples*			
		1	2B	3B	7B
8/21/70	30	0.00	0.00	0.00_1	0.01
8/24/70	30	0.00_5	0.00_5	0.30	1.30
8/27/70	30	0.01	0.01	0.01	0.18
8/30/70	30	0.03	0.00	0.20	0.50
9/2/70	60	0.02_1	0.00	0.00_2	0.02_5
9/5/70	60	0.00	0.00	0.04_5	0.00_4
9/9/70	60	0.00_8	0.00_5	0.01	0.01_8
9/11/70	60	0.02	0.00	0.01_5	0.03
9/14/70	120	8.0	10.0	--	--
9/18/70	120	0.00_9	0.00_5	0.00_5	0.01_5
9/20/70	120	0.10	0.00_7	0.00_7	0.03
9/23/70	120	0.01_8	0.01_3	0.01	0.00_8

Table 43. continued

Date Samples Composited	Ammonia Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Wastewater Samples*			
		1	2B	3B	7B
9/29/70	240	0.01_5	0.01_2	0.01	0.00_4
10/2/70	240	0.01_2	0.00_6	0.01_1	0.28
10/5/70	240	0.01_1	0.01_2	0.00_5	0.08_9
10/8/70	240	0.00_5	0.00_7	0.00_9	0.02_5
10/11/70	210	0.00_4	0.00_5	0.00_5	0.02
10/13/70	-0-	0.00_8	0.00_5	0.00_5	0.00_6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 44. NITRITE PLUS NITRATE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE SAMPLES PRETREATMENT BY ADDITION OF AMMONIA
TREATMENT SYSTEM B

Date Samples Collected	Ammonia Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentrations (mg/l) in Samples* 1	2B	3B	7B
8/21/70	30	0.00	0.02	0.05	0.32_2
8/24/70	30	0.02	0.07_5	--	--
8/27/70	30	0.00_5	0.01	0.12	1.50
8/30/70	30	0.02	0.00_2	0.75	4.00
9/2/70	60	0.40	0.00	0.00_6	3.75
9/5/70	60	0.01_5	0.03	0.21	0.13
9/9/70	60	0.00_9	0.00_4	0.00_6	1.45
9/11/70	60	0.00_2	0.01_2	0.00_9	0.01
9/14/70	60	0.00_8	0.00_7	--	--
9/18/70	120	0.06	0.08	0.08	0.04
9/20/70	120	0.12	0.08	0.07	0.14
9/23/70	120	0.11	0.11	0.10	0.08

Table 44. continued

Date Samples Collected	Ammonia Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentrations (mg/l) in Samples* 1	2B	3B	7B
9/29/70	240	0.12	0.01_2	0.01	0.00_4
10/2/70	240	0.11	0.08	0.11	0.28
10/5/70	240	0.08	0.06	0.08	0.36
10/8/70	240	0.06	0.06	0.09	0.12
10/11/70	210	0.10	0.10	0.05	0.14
10/13/70	-0-	0.08	0.16	0.12	0.04
10/15/70	-0-	--	--	0.05	--

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 45. DISSOLVED OXYGEN CONCENTRATIONS IN WASTEWATERS
PRETREATMENT BY ADDITION OF AMMONIA
TREATMENT SYSTEM B

Date	Ammonia Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters*						
		1	2B	3B	4B	5B	6B	7B
8/19/70	30	0.6	0.7	0.6	0.8	1.0	1.3	0.5
8/20/70	30	1.3	1.0	0.7	0.7	0.8	1.2	0.7
8/24/70	30	0.6	0.8	0.4	4.2	4.2	1.4	0.7
8/25/70	30	0.4	0.6	0.6	2.1	0.7	1.7	0.7
8/26/70	30	0.5	0.7	0.4	1.6	0.8	1.6	0.5
8/27/70	30	0.3	0.6	0.4	1.8	0.5	1.7	0.5
8/28/70	30	0.8	0.4	0.5	2.6	0.7	1.4	0.5
8/31/70	60	0.6	1.0	0.3	5.6	1.7	2.2	0.4
9/1/70	60	0.8	0.6	0.6	3.5	0.8	1.7	0.6
9/2/70	60	0.5	0.4	0.5	3.0	0.8	1.3	0.4
9/3/70	60	0.4	0.5	0.5	0.5	0.5	1.4	0.6
9/4/70	60	0.4	0.8	0.5	0.8	0.5	1.2	0.4

Table 45. continued

Date	Ammonia Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters*						
		1	2B	3B	4B	5B	6B	7B
9/5/70	60	1.6	1.3	1.5	0.9	1.0	1.8	0.3
9/8/70	60	0.8	0.8	0.5	0.8	0.7	1.8	0.3
9/9/70	60	0.7	0.4	0.4	0.5	0.5	1.1	0.5
9/10/70	60	0.4	0.7	0.5	0.5	0.8	1.2	0.5
9/11/70	60	0.4	0.8	0.5	0.6	0.6	1.2	0.4
9/14/70	120	0.3	0.9	0.5	0.7	0.9	1.2	0.5
9/15/70	120	0.6	1.1	0.6	0.7	0.8	1.1	0.4
9/16/70	120	0.4	1.0	0.5	0.8	0.8	1.5	0.6
9/17/70	120	0.3	0.6	0.5	0.5	1.0	1.3	0.3
9/22/70	120	0.4	0.7	0.4	0.5	0.8	1.8	0.4
9/23/70	120	0.9	0.6	0.3	0.7	0.7	1.1	0.4
9/24/70	120	0.4	0.8	0.4	0.6	0.8	1.3	0.3
9/25/70	120	0.4	0.9	0.5	0.5	0.8	0.9	0.4

Table 45. continued

Date	Ammonia Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters*						
		1	2B	3B	4B	5B	6B	7B
10/2/70	240	0.5	0.9	0.8	0.7	0.9	2.3	0.6
10/5/70	240	0.5	1.2	0.6	0.7	0.7	1.7	0.7
10/6/70	240	0.6	0.6	0.5	0.7	0.6	1.5	0.7
10/7/70	240	1.6	0.6	0.5	0.6	0.6	0.9	0.5
10/8/70	240	1.3	0.5	0.6	0.7	0.7	0.7	0.5
10/9/70	240	1.3	0.9	0.5	0.6	0.6	0.9	0.6
10/12/70	-0-	0.8	0.9	0.5	0.7	0.7	0.8	0.5
10/13/70	-0-	0.4	1.1	0.5	0.5	0.4	0.9	0.4
10/14/70	-0-	0.6	2.5	0.5	0.5	0.5	0.8	0.5
10/15/70	-0-	1.5	1.4	0.6	0.4	5.6	1.2	0.6

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 46. HYDROGEN SULFIDE CONCENTRATIONS IN WASTEWATERS
PRETREATMENT BY ADDITION OF AMMONIA
TREATMENT SYSTEM B

Date	Ammonia Feed Rate (lbs/day)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*					
		1	2B	3B	4B	5B	7B
8/18/70	30	0.0	0.0	0.0	0.0	0.0	0.0
8/20/70	30	0.0	0.0	0.0	0.0	0.0	0.0
8/21/70	30	0.0	0.0	0.0	0.0	0.0	0.0
8/22/70	30	0.0	0.0	0.0	0.0	0.0	0.0
8/24/70	30	0.0	0.0	0.0	0.0	0.0	0.0
8/27/70	30	0.0	0.0	0.0	0.0	0.0	0.0
8/28/70	30	0.0	0.0	0.0	0.0	0.0	0.0
9/1/70	60	0.0	0.1	0.1	0.0	0.0	0.0
9/2/70	60	0.0	0.0	0.1	0.0	0.0	0.0
9/3/70	60	0.0	0.0	0.0	0.0	0.0	0.0
9/4/70	60	0.0	0.0	0.0	0.0	0.0	0.0
9/8/70	60	0.0	0.0	0.1	0.0	0.0	0.0

Table 46. continued

Date	Ammonia Feed Rate (lbs/day)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*					
		1	2B	3B	4B	5B	7B
9/10/70	60	0.0	0.0	0.5	0.0	0.0	0.0
9/11/70	60	0.0	0.1	0.0	0.0	0.0	0.0
9/14/70	60	0.0	0.0	0.1	0.0	0.0	0.0
9/15/70	120	0.0	0.0	0.3	0.0	0.0	0.0
9/16/70	120	0.0	0.0	0.4	0.0	0.0	0.0
9/17/70	120	0.0	0.0	1.0	0.0	0.0	0.1
9/18/70	120	0.0	0.0	0.0	0.0	0.0	0.0
9/21/70	120	0.0	0.0	0.3	0.0	0.0	0.0
9/22/70	120	0.1	0.2	0.4	0.0	0.0	0.0
9/23/70	120	0.1	0.0	0.4	0.0	0.0	0.0
9/24/70	120	0.0	0.0	0.4	0.0	0.0	0.0
9/25/70	120	0.2	0.0	0.4	0.0	0.0	0.0
9/28/70	120	0.0	0.0	0.0	0.0	0.0	0.0

Table 46. continued

Date	Ammonia Feed Rate (lbs/day)	Hydrogen Sulfide Concentrations (mg/l) in Wastewaters*					
		1	2B	3B	4B	5B	7B
9/29/70	240	0.0	0.0	0.2	0.0	0.0	0.0
9/30/70	240	0.0	0.0	0.3	0.0	0.0	0.0
10/1/70	240	0.0	0.0	0.0	0.0	0.0	0.0
10/2/70	240	0.0	0.1	0.3	0.0	0.0	0.0
10/5/70	240	0.0	0.0	0.1	0.0	0.0	0.0
10/6/70	240	0.0	0.0	0.3	0.0	0.0	0.0
10/7/70	240	0.0	0.0	0.5	0.0	0.0	0.0
10/12/70	-0-	0.0	0.0	0.4	0.0	0.4	0.0
10/13/70	-0-	0.0	0.0	2.0	1.0	2.0	0.0
10/14/70	-0-	0.1	0.0	4.0	1.0	2.0	0.0
10/15/70	-0-	0.0	0.0	0.0	0.0	2.0	0.3

* See Table on Wastewater Identification Code for Description of Wastewaters.

Table 47. HYDROGEN ION CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF AMMONIA
TREATMENT SYSTEM B

Date Samples Collected	Ammonia Feed Rate (lbs/day)	pH Values of Wastewater Samples*			
		1	2B	3B	7B
8/18/70	30	7.2	7.3	7.3	7.5
8/20/70	30	7.0	7.1	7.3	7.5
8/21/70	30	7.2	7.3	7.2	7.5
8/22/70	30	7.4	7.4	7.4	7.6
8/25/70	30	7.0	7.3	7.3	7.5
8/27/70	30	7.1	7.3	7.3	7.5
8/28/70	30	6.9	7.3	7.4	7.5
8/31/70	30	7.0	7.4	7.4	7.4
9/1/70	60	7.1	7.4	7.4	7.4
9/2/70	60	7.0	7.3	7.4	7.5
9/3/70	60	7.0	7.2	7.2	7.4
9/4/70	60	6.9	7.2	7.1	7.4

Table 47. continued

Date Samples Collected	Ammonia Feed Rate (lbs/day)	pH Values of Wastewater Samples*			
		1	2B	3B	7B
9/5/70	60	7.1	7.3	7.4	7.5
9/8/70	60	7.0	7.2	7.3	7.4
9/9/70	60	7.1	7.2	7.2	7.4
9/10/70	60	7.0	7.1	7.1	7.4
9/11/70	60	7.0	7.2	7.2	7.4
9/12/70	60	7.2	7.1	7.2	7.4
9/13/70	60	6.8	7.1	--	--
9/15/70	120	6.4	6.8	7.0	7.2
9/16/70	120	6.7	7.0	7.1	7.2
9/17/70	120	6.5	6.8	6.9	7.1
9/18/70	120	6.8	6.9	6.8	7.1
9/22/70	120	6.7	6.9	7.0	7.0
9/23/70	120	6.5	6.8	6.9	7.1
9/24/70	120	6.4	6.8	6.8	7.2

Table 47. continued

Date Samples Collected	Ammonia Feed Rate (lbs/day)	pH Values of Wastewater Samples*			
		1	2B	3B	7B
9/25/70	120	6.8	6.8	6.8	7.1
9/28/70	120	6.8	7.0	7.1	7.2
9/29/70	240	6.9	7.0	7.0	7.2
9/30/70	240	6.8	6.9	7.0	7.2
10/1/70	240	6.9	7.0	7.0	7.2
10/2/70	240	6.9	7.0	6.9	7.3
10/5/70	240	6.6	7.0	7.0	7.2
10/6/70	240	6.8	6.9	6.8	7.1
10/7/70	240	6.7	6.9	6.9	7.2
10/12/70	-0-**	6.8	7.0	7.1	7.3
10/13/70	-0-	6.8	7.0	6.8	7.1
10/15/70	-0-	7.0	7.0	7.0	7.3

* See Table on Wastewater Identification Code for Description of Wastewaters.

** Addition of Ammonia was Discontinued at 1200 hours on 10/12/70.

APPENDIX D

EXPERIMENTAL DATA

PRETREATMENT BY ADDITION OF CHLORINE AND BY ADDITION OF POTASSIUM PERMANGANATE

Table 48. WASTEWATER FLOWS AND TEMPERATURES
PRETREATMENT BY ADDITION OF CHLORINE AND BY ADDITION OF POTASSIUM PERMANGANATE
TREATMENT SYSTEMS A AND B

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A	System B	Total	
10/31/70	4.31	1.51	5.82	--
11/1/70	3.58	1.21	4.79	--
11/2/70	3.90	1.34	5.24	64
11/3/70	5.23	1.83	7.07	63
11/4/70	4.81	1.64	6.46	63
11/5/70	4.26	1.61	5.87	63
11/6/70	4.07	1.44	5.51	61
11/7/70	3.86	1.27	5.13	--
11/8/70	3.41	1.20	4.61	--
11/9/70	3.77	1.35	5.12	61
11/10/70	4.48	1.20	5.68	63
11/11/70	5.20	1.20	6.40	--

Table 48. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A	System B	Total	
11/12/70	5.61	1.27	6.88	62
11/13/70	5.08	1.41	6.49	62
11/14/70	4.45	1.54	5.99	--
11/15/70	5.05	1.53	6.58	--
11/16/70	5.16	1.72	6.88	60
11/17/70	4.87	1.67	6.54	59
11/18/70	4.91	1.29	6.20	59
11/19/70	4.50	1.64	6.14	59
11/20/70	5.13	1.63	6.76	60
11/21/70	4.63	1.70	6.33	--
11/22/70	4.37	1.37	5.74	--
11/23/70	4.58	1.61	6.19	58
11/24/70	4.29	1.65	5.94	57

Table 48. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A	System B	Total	
11/25/70	4.15	1.61	5.76	57
11/26/70	3.55	1.46	5.01	--
11/27/70	3.97	1.40	5.37	--
11/28/70	3.73	1.43	5.16	--
11/29/70	3.53	1.32	4.85	--
11/30/70	4.57	1.01	5.58	57
12/1/70	5.11	2.56	7.67	61
12/2/70	5.09	2.54	7.63	61
12/3/70	5.10	2.55	7.65	61
12/4/70	4.94	2.47	7.41	61
12/5/70	4.64	2.32	6.96	60
12/6/70	4.44	2.22	6.66	59
12/7/70	4.93	2.46	7.39	59

Table 48. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A	System B	Total	
12/8/70	4.89	2.44	7.33	61
12/9/70	4.60	2.31	6.91	60
12/10/70	4.88	2.44	7.32	60
12/11/70	4.73	2.36	7.09	60
12/12/70	4.92	2.45	7.37	58
12/13/70	4.45	2.22	6.67	58
12/14/70	4.89	2.45	7.34	59
12/15/70	4.79	2.40	7.19	60
12/16/70	4.91	2.46	7.37	59
12/17/70	5.45	2.73	8.18	58
12/18/70	5.13	2.56	7.69	59
12/19/70	4.77	2.39	7.16	59
12/20/70	4.57	2.28	6.85	58
12/21/70	5.08	2.54	7.62	59

Table 48. continued

Date	Wastewater Flows (mgd)			Wastewater Temperature (°F)
	System A	System B	Total	
12/22/70	9.70	4.85	14.55	58
12/23/70	14.66	5.00	19.66	58
12/24/70	9.94	4.97	14.91	56
12/25/70	6.51	3.25	9.76	56

Table 49. BOD_5 VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Dates Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples				% BOD_5 Removal
		1	2A	3A	7A	
11/1/70	20	155	219	108	23	85
11/3/70	20	298	225	145	33	89
11/4/70	20	224	237	328	98	56
11/6/70	20	208	223	210	16	92
11/8/70	20	310	210	195	60	81
11/10/70	20	186	197	259	44	76
11/12/70	20	92	186	194	48	48
11/15/70	40	97	119	94	20	79
11/17/70	40	131	172	127	28	79
11/19/70	40	118	168	118	37	69
11/22/70	40	Lost	90	119	15	--
11/24/70	40	161	191	215	41	75

Table 49. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples				% BOD_5 Removal
		1	2A	3A	7A	
11/25/70	40	82	155	185	28	66
11/27/70	80	138	138	149	26	81
11/29/70	80	84	83	132	27	68
12/1/70	80	207	213	209	Lost	--
12/2/70	80	191	181	133	64	66
12/4/70	80	137	158	154	40	71
12/6/70	80	372	308	189	52	86
12/8/70	80	321	278	247	92	71
12/10/70	80	235	303	185	47	80
12/12/70	160	108	135	107	49	55
12/14/70	160	242	234	252	59	76
12/16/70	160	255	186	214	65	75
12/18/70	160	198	209	200	79	60

Table 49. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Wastewater Samples				% BOD_5 Removal
		1	2A	3A	7A	
12/21/70	160	270	163	112	49	82
12/22/70	160	130	142	134	48	63
12/25/70	160	86	82	49	25	71

Table 50. COD VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE
TREATMENT SYSTEM A

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples				% COD Removal
		1	2A	3A	7A	
11/1/70	20	112_0	142_0	447	166	85
11/3/70	20	115_5	972	542	207	82
11/4/70	20	108_5	104_4	597	183	83
11/6/70	20	680	102_4	648	152	78
11/8/70	20	981	701	625	90	91
11/10/70	20	837	480	656	156	81
11/13/70	40	432	628	528	148	66
11/15/70	40	400	550	360	222	44
11/17/70	40	824	920	775	116	86
11/19/70	40	408	572	408	190	53
11/21/70	40	337	693	779	153	55
11/22/70	40	622	332	441	87	86

Table 50. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples				% COD Removal
		1	2A	3A	7A	
11/24/70	40	404	524	656	140	65
11/27/70	80	508	376	608	108	79
12/1/70	80	696	712	760	236	66
12/3/70	80	532	648	908	272	49
12/4/70	80	871	105_7	824	177	80
12/6/70	80	Lost	Lost	625	89	--
12/8/70	80	133_4	106_3	845	275	79
12/10/70	80	529	995	436	222	58
12/12/70	160	380	394	345	154	60
12/14/70	160	854	718	726	207	76
12/16/70	160	593	608	574	240	60
12/18/70	160	390	413	374	181	54
12/21/70	160	495	363	289	234	53

Table 50. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples				% COD Removal
		1	2A	3A	7A	
12/23/70	160	140	148	296	273	-95%
12/25/70	160	299	334	208	97	68

Table 51. SUSPENDED SOLIDS LEVELS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY THE ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Date Samples Composited	$KMnO_4$ Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples				% SS Removal
		1	2A	3A	7A	
10/31/70	20	800	790	170	52	94
11/1/70	20	700	700	310	72	90
11/2/70	20	500	860	590	76	85
11/3/70	20	730	865	300	84	88
11/4/70	20	490	450	270	56	89
11/5/70	20	690	450	590	148	79
11/6/70	20	290	370	190	44	85
11/8/70	20	630	650	540	0	100
11/9/70	20	390	470	980	28	86
11/10/70	20	540	440	590	36	85
11/11/70	20	210	220	320	68	68
11/12/70	20	340	420	300	36	89

Table 51. continued

Date Samples Composited	$KMnO_4$ Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples				% SS Removal
		1	2A	3A	7A	
11/13/70	40	80	130	200	4	95
11/14/70	40	310	270	200	36	88
11/15/70	40	210	270	190	16	92
11/16/70	40	80	220	120	Lost	--
11/17/70	40	380	330	270	56	85
11/18/70	40	300	250	270	84	72
11/19/70	40	140	190	70	72	49
11/20/70	40	60	40	170	624	-1040
11/21/70	40	260	480	420	56	78
11/22/70	40	230	310	300	40	83
11/23/70	40	300	170	260	32	89
11/24/70	40	260	290	160	12	95
11/25/70	40	90	210	200	24	73

Table 51. continued

Date Samples Composited	$KMnO_4$ Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples				% SS Removal
		1	2A	3A	7A	
11/26/70	80	170	160	330	28	83
11/27/70	80	210	100	210	12	94
11/28/70	80	500	320	300	84	83
11/29/70	80	110	190	270	44	60
11/30/70	80	290	320	300	48	83
12/1/70	80	270	300	370	96	64
12/2/70	80	370	420	350	64	83
12/3/70	80	170	410	270	136	20
12/4/70	80	520	107_0	950	112	77
12/5/70	80	350	440	210	44	87
12/6/70	80	380	520	300	92	76
12/7/70	80	630	930	570	212	66
12/8/70	80	450	500	300	92	80
12/9/70	80	490	360	320	80	84

Table 51. continued

Date Samples Composited	$KMnO_4$ Feed Rate (lbs/day)	SS (mg/l) in Wastewater Samples				Removal
		1	2A	3A	7A	
12/10/70	80	160	260	180	108	32
12/11/70	80	150	260	130	48	68
12/12/70	160	10	80	10	4	60
12/13/70	160	190	480	130	136	16
12/14/70	160	380	320	350	160	58
12/15/70	160	260	250	180	16	38
12/16/70	160	360	310	200	120	66
12/17/70	160	370	580	540	120	68
12/18/70	160	100	90	40	20	80
12/19/70	160	100	120	60	56	44
12/20/70	160	80	40	10	44	45
12/21/70	160	40	10	10	16	60
12/22/70	160	110	200	80	28	75

Table 52. ORGANIC NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Date Samples Composited	$KMnO_4$ Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples			
		1	2A	3A	7A
11/2/70	20	4.7	6.1	2.7	1.0
11/5/70	20	5.1	3.2	2.6	1.8
11/8/70	20	6.4	6.3	6.8	2.5
11/14/70	40	1.3	0.8	1.0	1.3
11/18/70	40	1.9	1.3	1.5	9.5
11/20/70	40	2.5	2.4	0	4.9
11/23/70	40	1.7	2.0	1.8	2.3
11/26/70	80	1.05	4.7	2.6	0.6
11/29/70	80	0	0.8	1.2	0
12/3/70	80	0.5	2.7	2.1	0.2
12/5/70	80	1.7	4.5	2.8	0.8
12/8/70	80	2.1	3.4	3.4	0.7

Table 52. continued

Date Samples Composited	$KMnO_4$ Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples			
		1	2A	3A	7A
12/11/70	80	1.2	3.1	2.7	1.6
12/14/70	160	1.8	2.4	2.0	1.4
12/17/70	160	1.6	2.6	2.0	1.2
12/20/70	160	0.5	1.2	1.0	1.6
12/22/70	160	2.6	2.7	2.4	2.0
12/25/70	160	0.1	1.5	0.3	1.4

Table 53. AMMONIA NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples			
		1	2A	3A	7A
11/2/70	20	12.1	11.8	14.6	14.9
11/5/70	20	12.8	10.4	11.6	11.4
11/8/70	20	11.5	9.0	11.5	14.2
11/14/70	40	14.0	8.6	9.4	8.1
11/18/70	40	6.9	7.7	5.7	7.2
11/20/70	40	10.0	8.0	7.5	6.4
11/23/70	40	10.9	8.7	8.0	8.0
11/26/70	80	8.2	6.8	9.2	4.1
11/29/70	80	10.5	10.1	10.0	8.7
12/3/70	80	10.8	11.3	9.1	7.2
12/5/70	80	10.1	13.6	12.2	6.3
12/8/70	80	12.7	12.2	11.3	10.2

Table 53. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples			
		1	2A	3A	7A
12/11/70	80	10.0	14.3	7.8	9.7
12/14/70	160	9.7	11.1	9.6	14.2
12/17/70	160	11.6	12.8	9.1	12.0
12/20/70	160	12.8	11.8	8.1	8.4
12/22/70	160	12.4	12.4	9.2	9.1
12/25/70	160	6.4	8.2	3.2	4.2

Table 54. NITRITE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Samples			
		1	2A	3A	7A
11/2/70	20	$.00_6$	$.00_5$	$.00_8$	.19
11/5/70	20	.16	.2	$.01_5$	.06
11/8/70	20	$.01_2$	.005	$.01_4$	.13
11/14/70	40	$.01_6$	$.01_8$	$.04_5$	.1
11/18/70	40	$.02_7$	$.01_9$	.02	.12
11/20/70	40	.31	.15	.29	.02
11/23/70	40	.14	.12	.14	.75
11/26/70	80	.01	.02	$.00_9$	.22
11/29/70	80	$.01_2$	.2	.21	.95
12/3/70	80	.16	$.03_8$	$.12_2$	.13
12/5/70	80	$.00_2$	$.00_6$	.08	.3
12/8/70	80	$.04_6$	$.07_5$	$.11_9$	.31

Table 54. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Samples			
		1	2A	3A	7A
12/11/70	80	.2	.04	.24	$.12_5$
12/14/70	160	.07	.16	.05	$.03_5$
12/17/70	160	.03	.09	.14	$.02_6$
12/20/70	160	$.01_9$	.02	.29	.10
12/22/70	160	.07	$.07_8$	.23	.01
12/25/70	160	.01	.01	$.02_7$	.11

Table 55. NITRITE PLUS NITRATE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentrations (mg/l) in Samples			
		1	2A	3A	7A
11/2/70	20	.08	.05	.05	1.45
11/5/70	20	.68	.90	.12	.29
11/8/70	20	.12	.19	.10	.80
11/14/70	40	.16	.20	.22	.46
11/18/70	40	.18	.20	.16	1.49
11/20/70	40	1.1	.56	.95	.10
11/23/70	40	.86	.92	1.48	5.55
11/26/70	80	.18	$.18_2$	$.12_1$	1.20
11/29/70	80	$.14_5$	1.20	1.20	5.53
12/3/70	80	1.30	.18	.62	.85
12/5/70	80	.1	.09	.43	1.80

Table 55. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentrations (mg/l) in Samples			
		1	2A	3A	7A
12/8/70	80	.42	.41	1.1	2.30
12/11/70	80	.24	.16	.76	.52
12/14/70	160	.49	1.25	.86	.85
12/17/70	160	.4	.85	1.50	.18
12/20/70	160	.18	.16	2.10	.65
12/22/70	160	.62	.78	2.10	.26
12/25/70	160	.14	.13	3.00	1.70

Table 56. DISSOLVED OXYGEN CONCENTRATIONS IN WASTEWATERS PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters											
		1	2A	3A	4A11	4A12	4A21	4A22	5A13	5A23	6A1	6A2	7A
10/30/70	20	2.6	1.6	0.6	0.9	0.5	3.8	6.3	1.3	5.5	3.9	8.6	0.6
11/2/70	20	0.6	1.3	0.7	0.6	0.7	0.8	3.5	1.5	4.4	2.9	7.6	0.6
11/3/70	20	4.5	5.6	1.4	0.6	0.5	0.6	2.0	1.5	5.8	1.2	8.6	0.5
11/4/70	20	1.8	2.8	0.8	0.5	0.5	0.5	0.8	0.6	4.5	0.6	8.2	0.5
11/5/70	20	2.3	3.3	0.9	0.6	0.7	0.6	0.8	1.2	6.2	1.3	7.6	1.9
11/6/70	20	1.5	5.4	1.0	0.6	0.6	0.5	0.7	0.7	3.3	0.6	6.7	0.5
11/9/70	20	0.5	7.0	3.0	0.4	0.5	0.4	0.8	1.1	3.7	0.6	5.7	0.5
11/10/70	20	2.4	6.7	4.2	0.5	0.5	0.6	0.7	0.9	2.1	1.6	4.4	1.7
11/12/70	20	1.5	6.2	2.3	0.6	0.5	0.5	0.6	2.4	3.0	1.4	5.1	0.5
11/13/70	40	1.6	7.8	4.9	1.0	1.0	0.8	1.0	3.5	3.4	3.2	4.8	0.6
11/16/70	40	2.4	7.6	5.3	0.7	0.9	1.0	1.8	2.6	4.9	2.6	5.8	2.9
11/17/70	40	1.2	7.6	2.5	0.4	0.5	0.5	1.8	0.4	3.1	0.5	3.2	0.6

Table 56. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters											
		1	2A	3A	4A11	4A12	4A21	4A22	5A13	5A23	6A1	6A2	7A
11/18/70	40	0.6	4.3	2.5	0.5	0.5	0.6	0.6	0.6	2.5	0.4	2.8	0.5
11/19/70	40	0.4	4.3	3.0	0.5	0.5	0.4	0.5	0.5	2.3	0.4	2.0	0.4
11/20/70	40	0.4	3.6	1.6	0.3	0.4	0.4	0.4	1.0	0.7	0.6	1.2	0.4
11/23/70	40	0.8	4.1	2.1	0.8	0.5	0.4	1.0	1.3	2.0	1.1	2.8	0.5
11/24/70	40	0.5	4.5	2.3	0.5	0.5	0.5	0.6	1.5	1.8	1.6	2.5	0.5
11/25/70	40	0.5	4.4	2.6	0.6	0.4	0.6	0.6	1.7	2.0	1.3	2.4	0.5
11/27/70	80	---------- meter out of service ----------											
11/30/70	80	1.0	4.5	2.5	0.6	0.6	0.5	0.7	1.4	2.4	0.6	1.9	0.5
12/1/70	80	0.5	3.9	2.5	0.5	0.5	0.5	0.5	1.3	2.1	0.7	2.3	0.5
12/2/70	80	1.0				0.4	0.2	0.2	2.1				
12/3/70	80	0.4				0.2		0.4	0.4	4.2			
12/4/70	80	0.3				1.5		0.4	1.0	4.8			
12/8/70	80	0.8											

Table 56. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	DO Concentrations (mg/l) in Wastewaters											
		1	2A	3A	4A11	4A12	4A21	4A22	5A13	5A23	6A1	6A2	7A
12/9/70	80	1.2				0.7		0.1	2.5	6.0			
12/10/70	80	1.0				0.6		0.6	1.6	3.4			
12/11/70	80	1.6				0.2		0.1	0.4	1.4			
12/14/70	160	0							2.8	4.9			
12/15/70	160	1.8							0.5	2.3			
12/16/70	160	4.5							0.4	0			
12/17/70	160	3.7							0.9	1.0			
12/18/70	160	4.1							0.7	1.5			
12/21/70	160	0.6							0.7	2.8			
12/22/70	160	3.3							0.3	0.3			
12/23/70	160	3.6							0.5	0.3			
12/24/70	160	4.8							7.2	6.5			
12/25/70	160	3.0							7.2	7.0			

Table 57. HYDROGEN ION CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SYSTEMS PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2A	3A	7A
10/31/70	20	7.0	7.0	7.1	7.4
11/2/70	20	6.5	6.8	7.0	7.4
11/3/70	20	7.0	7.2	7.3	7.4
11/4/70	20	7.1	7.2	7.3	7.3
11/5/70	20	7.1	7.3	7.3	7.4
11/6/70	20	7.2	7.2	7.4	7.4
11/9/70	20	7.0	7.3	7.5	7.6
11/10/70	20	7.15	7.05	7.39	7.55
11/12/70	20	7.2	7.4	7.5	7.7
11/13/70	40	7.5	7.4	7.5	7.7
11/17/70	40	7.15	7.35	7.42	7.6
11/18/70	40	7.1	7.2	7.5	7.6

Table 57. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2A	3A	7A
11/19/70	40	7.1	7.3	7.5	7.5
11/20/70	40	7.0	7.2	7.3	7.3
11/23/70	40	7.0	7.2	7.4	7.6
11/24/70	40	7.1	7.2	7.4	7.5
11/25/70	40	7.2	7.3	7.4	7.4
11/27/70	80	7.1	7.2	7.4	7.4
11/28/70	80	7.1	7.3	7.36	7.4
11/29/70	80	6.9	7.3	7.3	7.4
12/1/70	80	7.0	7.1	7.2	7.3
12/2/70	80	7.0	7.1	7.2	7.26
12/3/70	80	7.2	7.3	7.4	7.05
12/4/70	80	6.7	7.0	7.2	7.3
12/5/70	80	7.05	7.15	7.2	7.3

Table 57. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2A	3A	7A
12/7/70	80	6.7	6.9	7.2	7.4
12/8/70	80	6.7	6.9	7.1	7.2
12/9/70	80	6.55	7.14	7.21	7.24
12/10/70	80	6.7	6.8	7.3	7.3
12/11/70	80	7.0	7.1	7.2	7.2
12/12/70	160	7.19	7.33	7.21	7.05
12/14/70	160	6.4	6.8	7.0	7.1
12/15/70	160	6.9	7.0	7.1	7.2
12/16/70	160	7.0	7.1	5.8	7.2
12/17/70	160	7.0	7.1	7.3	7.3
12/18/70	160	7.2	7.3	7.3	7.3
12/19/70	160	7.24	7.36	7.45	7.35
12/21/70	160	6.9	7.2	7.4	7.3

Table 57. continued

Date Samples Collected	$KMnO_4$ Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2A	3A	7A
12/22/70	160	7.2	7.25	7.35	7.3
12/23/70	160	7.1	7.3	7.3	7.3
12/24/70	160	7.0	7.3	7.3	7.3

Table 58. MANGANESE CONCENTRATION IN GRAB SAMPLES PRETREATMENT BY ADDITION OF POTASSIUM PERMANGANATE TREATMENT SYSTEM A

Collection Data	Sampling Point	mg Mn/l
12/11/70	7A	0.35
12/11/70	2A	0.71
12/11/70	4A 2-2	1.33
12/17/70	2A	0.17
12/17/70	3A	0.14
12/17/70	4A 2-2	0.84
12/17/70	7A	0.27
12/24/70	2A	0.32

Table 59. BOD_5 VALUES OF 24-HOUR COMPOSITE SAMPLES OF TREATMENT PLANT INFLUENT AND EFFLUENT
PRETREATMENT BY CHLORINATION
TREATMENT SYSTEM B

Date Samples Collected	Sewage Flow (mgd)	Chlorine Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Samples		% BOD_5 Removal
			Influent	Effluent	
11/1/70	1.21	150	155	15	90
11/3/70	1.83	150	298	8	97
11/4/70	1.64	150	224	23	90
11/6/70	1.44	150	208	22	89
11/8/70	1.20	150	310	7	98
11/10/70	1.20	150	186	9	95
11/12/70	1.27	150	92	9	90
11/15/70	1.53	300	97	6	94
11/17/70	1.67	300	131	21	84
11/19/70	1.64	300	118	--	--
11/22/70	1.37	300	--	14	--
11/24/70	1.65	300	161	23	86

Table 59. continued

Date Samples Collected	Sewage Flow (mgd)	Chlorine Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Samples		% BOD_5 Removal
			Influent	Effluent	
11/25/70	1.61	300	82	22	73
11/27/70	1.40	600	138	24	83
11/29/70	1.32	600	84	22	74
12/1/70	2.56	600	207	--	--
12/2/70	2.54	600	191	104	46
12/4/70	2.47	600	137	45	67
12/6/70	2.22	600	372	34	91
12/8/70	2.44	600	321	54	83
12/10/70	2.44	600	235	82	65
12/12/70	2.45	1200	108	35	68
12/14/70	2.45	1200	242	62	74
12/16/70	2.46	1200	255	77	70

Table 59. continued

Date Samples Collected	Sewage Flow (mgd)	Chlorine Feed Rate (lbs/day)	BOD_5 Values (mg/l) of Samples		% BOD_5 Removal
			Influent	Effluent	
12/18/70	2.56	1200	198	76	62
12/21/70	2.54	1200	270	49	82
12/22/70	4.85	1200	130	53	59
12/25/70	6.51	1200	86	26	70

Table 60. COD VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF CHLORINE
TREATMENT SYSTEM B

Date Samples Composited	Chlorine Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples				% COD Removal
		1	2B	3B	7B	
11/1/70	150	112_0	140_5	257	66	94
11/3/70	150	115_5	102_8	457	104	91
11/4/70	150	108_5	921	342	176	84
11/6/70	150	680	100_8	364	84	88
11/8/70	150	981	756	255	146	85
11/10/70	150	837	552	591	36	96
11/13/70	300	432	620	420	56	87
11/15/70	300	400	526	300	64	84
11/17/70	300	824	928	440	156	81
11/19/70	300	408	551	120	400	2
11/21/70	300	337	655	468	78	77
11/22/70	300	622	382	262	73	88

Table 60. continued

Date Samples Composited	Chlorine Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples				% COD Removal
		1	2B	3B	7B	
11/24/70	300	404	696	464	92	77
11/27/70	600	508	616	338	68	87
11/29/70	600	305	588	420	140	54
12/1/70	600	696	822	544	260	63
12/3/70	600	532	598	528	283	47
12/4/70	600	871	104_8	385	156	82
12/6/70	600	Lost	Lost	404	23	--
12/8/70	600	133_4	111_7	822	178	87
12/10/70	600	529	944	537	358	32
12/12/70	1200	380	535	391	155	59
12/14/70	1200	854	790	647	191	78
12/16/70	1200	593	598	572	206	65

Table 60. continued

Date Samples Composited	Chlorine Feed Rate (lbs/day)	COD Values (mg/l) of Wastewater Samples				% COD Removal
		1	2B	3B	7B	
12/18/70	1200	390	421	399	164	58
12/21/70	1200	495	433	324	281	43

Table 61. SUSPENDED SOLIDS LEVELS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY THE ADDITION OF CHLORINE TREATMENT SYSTEM B

Date Samples Composited	Chlorine Feed Rate (lbs/day)	SS (mg/l) in Wastewater Sample				% SS Removal
		1	2B	3B	7B	
10/31/70	150	800	840	100	4	100
11/1/70	150	700	680	210	4	99
11/2/70	150	500	830	200	4	99
11/3/70	150	730	650	190	8	99
11/4/70	150	489	550	110	4	99
11/5/70	150	690	850	350	(184)	73
11/6/70	150	290	450	30	4	99
11/7/70	150	630	600	0	0	100
11/9/70	150	390	370	30	0	100
11/10/70	150	540	560	160	0	100
11/11/70	150	210	320	180	12	94
11/12/70	150	340	490	70	8	98
11/13/70	300	80	150	10	4	95

Table 61. continued

Date Samples Composited	Chlorine Feed Rate (lbs/day)	SS (mg/l) in Wastewater Sample 1	2B	3B	7B	% SS Removal
11/14/70	300	310	270	170	40	87
11/15/70	300	210	340	70	12	94
11/16/70	300	80	150	0	Lost	--
11/17/70	300	380	330	170	64	83
11/18/70	300	300	330	130	44	85
11/19/70	300	140	150	20	84	40
11/20/70	300	60	60	10	8	87
11/21/70	300	260	450	140	24	91
11/22/70	300	230	370	190	28	88
11/23/70	300	300	130	100	44	85
11/24/70	300	260	310	130	4	98
11/25/70	300	90	190	110	4	96
11/26/70	600	170	120	80	24	86

Table 61. continued

Date Samples Composited	Chlorine Feed Rate (lbs/day)	SS (mg/l) in Wastewater Sample				% SS Removal
		1	2B	3B	7B	
11/27/70	600	210	100	60	24	89
11/28/70	600	500	300	240	84	83
11/29/70	600	110	250	150	32	71
11/30/70	600	290	300	120	56	81
12/1/70	600	270	330	180	136	50
12/2/70	600	370	470	90	88	76
12/3/70	600	170	330	110	120	29
12/4/70	600	520	104$_0$	430	76	85
12/5/70	600	350	340	100	28	92
12/6/70	600	380	430	230	84	78
12/7/70	600	630	970	510	124	80
12/8/70	600	450	570	260	52	88
12/9/70	600	490	350	200	44	91
12/10/70	600	160	150	150	52	67

Table 61. continued

Date Samples Composited	Chlorine Feed Rate (lbs/day)	SS (mg/l) in Wastewater Sample				% SS Removal
		1	2B	3B	7B	
12/11/70	600	150	310	80	44	71
12/12/70	1200	10	80	10	4	60
12/13/70	1200	190	480	300	124	35
12/14/70	1200	380	250	270	152	60
12/15/70	1200	260	200	60	12	95
12/16/70	1200	360	380	170	88	76
12/17/70	1200	370	470	350	96	74
12/18/70	1200	100	50	10	12	88
12/19/70	1200	100	100	70	24	76
12/20/70	1200	80	20	10	4	95
12/21/70	1200	40	40	00	8	80
12/22/70	1200	110	130	30	24	80
12/23/70	1200	140	170	130	76	46

Table 61. continued

Date Samples Composited	Chlorine Feed Rate (lbs/day)	SS (mg/l) in Wastewater Sample				% SS Removal
		1	2B	3B	7B	
12/24/70	1200	30	50	40	4	87
12/25/70	1200	80	100	10	4	95

Table 62. ORGANIC NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF CHLORINE
TREATMENT SYSTEM B

Date Samples Composited	Chlorine Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples			
		1	2B	3B	7B
11/2/70	150	4.7	5.4	1.1	0.9
11/5/70	150	5.1	2.7	1.8	5.0
11/8/70	150	6.4	6.9	2.5	1.1
11/14/70	300	1.3	1.3	1.6	0.1
11/18/70	300	1.9	1.9	1.7	0.3
11/20/70	300	2.5	2.8	2.1	0.1
11/23/70	300	1.7	1.6	1.5	0.5
11/26/70	600	1.05	2.1	2.0	0.2
11/29/70	600	-0-	2.1	1.4	-0-
12/3/70	600	0.5	2.1	4.6	0.6
12/5/70	600	1.7	2.3	2.8	1.0
12/8/70	600	2.1	3.4	3.4	0.8

Table 62. continued

Date Samples Composited	Chlorine Feed Rate (lbs/day)	Organic N Concentrations (mg/l) in Samples			
		1	2B	3B	7B
12/11/70	600	1.2	2.4	2.1	1.6
12/14/70	1200	1.8	2.2	2.0	1.2
12/17/70	1200	1.6	2.0	2.3	0.2
12/20/70	1200	0.5	2.0	2.2	1.4
12/22/70	1200	2.6	3.2	3.2	1.6
12/25/70	1200	0.1	2.6	0.6	0.1

Table 63. AMMONIA NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF CHLORINE
TREATMENT SYSTEM B

Dates Samples Collected	Chlorine Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples			
		1	2B	3B	7B
11/2/70	150	12.1	11.7	12.9	17.3
11/5/70	150	12.8	10.1	10.7	11.7
11/8/70	150	11.5	8.8	12.3	17.0
11/14/70	300	14.0	8.6	9.7	5.7
11/18/70	300	6.9	4.3	4.7	1.1
11/20/70	300	10.0	9.0	6.1	4.0
11/23/70	300	10.9	7.7	9.7	3.9
11/26/70	600	8.2	5.0	1.0	2.7
11/29/70	600	10.5	8.9	10.7	3.3
12/3/70	600	10.8	10.2	11.2	6.5
12/5/70	600	10.1	8.9	11.8	6.9
12/8/70	600	12.7	9.0	11.8	8.2

Table 63. continued

Dates Samples Collected	Chlorine Feed Rate (lbs/day)	Ammonia Nitrogen Concentrations (mg/l) in Samples			
		1	2B	3B	7B
12/11/70	600	10.0	10.4	9.7	6.7
12/14/70	1200	9.7	4.9	6.6	7.5
12/17/70	1200	11.6	8.1	9.1	8.7
12/20/70	1200	12.8	6.4	5.2	6.4
12/22/70	1200	12.4	10.5	7.2	7.2
12/25/70	1200	6.4	3.7	1.3	0.2

Table 64. NITRITE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF CHLORINE
TREATMENT SYSTEM B

Date Samples Collected	Chlorine Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Samples			
		1	2B	3B	7B
11/2/70	150	$.00_6$	$.01_2$	$.03_2$	.08
11/5/70	150	.16	0.19	.19	$.08_3$
11/8/70	150	$.01_2$	$.01_6$	.14	.45
11/14/70	300	$.01_6$	.14	$.15_9$	.13
11/18/70	300	$.02_7$	$.02_5$	$.03_8$	2.0
11/20/70	300	.31	.17	.25	.19
11/23/70	300	.14	.13	.17	18.5
11/26/70	600	.01	.16	.2	$.14_9$
11/29/70	600	$.01_2$	.19	.19	1.72
12/3/70	600	.16	.2	.27	.24
12/5/70	600	$.00_2$	$.14_9$	.19	$.12_5$
12/8/70	600	$.04_6$	$.08_2$	.18	.07

Table 64. continued

Date Samples Collected	Chlorine Feed Rate (lbs/day)	Nitrite Nitrogen Concentrations (mg/l) in Samples			
		1	2B	3B	7B
12/11/70	600	.2	.31	.4	$.14_5$
12/14/70	1200	.07	.03	.02	.35
12/17/70	1200	.03	$.08_1$	$.08_2$	$.01_4$
12/20/70	1200	$.01_9$	.09	$.04_5$	$.08_5$
12/22/70	1200	.07	.10	.05	.05
12/25/70	1200	.01	$.02_5$	$.02_1$	.09

Table 65. NITRITE PLUS NITRATE NITROGEN CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY ADDITION OF CHLORINE TREATMENT SYSTEM B

Dates Samples Collected	Chlorine Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentration (mg/l) in Samples			
		1	2B	3B	7B
11/2/70	150	.08	.05	.16	.44
11/5/70	150	.68	.95	1.20	.38
11/8/70	150	.12	.12	.92	1.50
11/14/70	300	.16	.79	1.50	.55
11/18/70	300	.18	.14	1.50	--
11/20/70	300	1.1	.72	1.49	.46
11/23/70	300	.86	1.49	1.50	23.81
11/26/70	600	.14[5]	1.30	1.40	18.51
12/3/70	600	1.30	1.59	1.75	1.69
12/5/70	600	.1	.90	.82	.55
12/8/70	600	.42	.85	1.75	.55
12/11/70	600	.24	1.40	1.65	.75

Table 65. continued

Dates Samples Collected	Chlorine Feed Rate (lbs/day)	NO_2^- plus NO_3^- Nitrogen Concentration (mg/l) in Samples			
		1	2B	3B	7B
12/14/70	1200	.49	.44	.31	1.50
12/17/70	1200	.4	.53	.60	.10
12/20/70	1200	.18	.59	.46	.39
12/22/70	1200	.62	1.00	.60	.37
12/25/70	1200	.14	1.90	.69	1.20

Table 66. DISSOLVED OXYGEN CONCENTRATIONS IN WASTEWATERS
PRETREATMENT BY ADDITION OF CHLORINE
TREATMENT SYSTEM B

Date Samples Collected	Chlorine Feed Rate (lbs/day)	DO Concentration (mg/l) in Wastewaters						
		1	2B	3B	4B	5B	6B	7B
10/30/70	150	2.6	5.9	0.6	0.5	0.5	1.7	0.5
11/2/70	150	0.6	5.5	0.8	0.8	0.6	1.6	0.4
11/3/70	150	4.5	9.3	2.0	0.7	1.0	1.9	0.5
11/4/70	150	1.8	8.5	1.0	0.8	0.8	1.7	0.5
11/5/70	150	2.3	8.1	1.3	3.5	1.1	2.0	0.7
11/6/70	150	1.5	9.6	1.4	1.0	0.9	1.6	0.4
11/9/70	150	0.5	11.3	8.1	7.0	4.2	4.9	0.8
11/10/70	150	2.4	9.6	8.8	5.4	1.4	2.1	0.8
11/12/70	150	1.5	8.4	3.8	1.6	0.6	1.8	0.5
11/13/70	300	1.6	10.8	9.5	1.8	0.9	1.7	0.5
11/16/70	300	2.4	10.6	10.6	3.8	2.5	2.1	0.9
11/17/70	300	1.2	10.5	5.1	0.6	0.5	1.0	0.4

Table 66. continued

Date Samples Collected	Chlorine Feed Rate (lbs/day)	DO Concentration (mg/l) in Wastewaters						
		1	2B	3B	4B	5B	6B	7B
11/18/70	300	0.6	5.5	4.5	0.5	0.5	1.0	0.5
11/19/70	300	0.4	5.3	5.0	0.5	0.5	1.2	0.4
11/20/70	300	0.4	5.2	4.6	0.6	0.6	0.9	0.5
11/23/70	300	0.8	5.2	4.5	1.2	0.8	1.1	0.4
11/24/70	300	0.5	5.4	5.0	0.6	0.6	1.0	0.4
11/25/70	300	0.5	5.5	4.9	0.8	0.9	1.0	0.4
11/27/70	600	---------- meter out of service ----------						
11/30/70	600	1.0	5.6	5.2	0.5	1.0	1.0	0.5
12/1/70	600	0.5	5.5	5.1	0.5	0.9	1.1	0.5
12/2/70	600	1.0			0.1	0.2		0.4
12/3/70	600	0.4			0.8	0.6		0.5
12/4/70	600	0.3			0.5	0.6		1.5
12/8/70	600	0.8						1.7

Table 66. continued

Date Samples Collected	Chlorine Feed Rate (lbs/day)	DO Concentration (mg/l) in Wastewaters						
		1	2B	3B	4B	5B	6B	7B
12/9/70	600	1.2			0.5	1.5		0.5
12/10/70	600	1.0			0.7	0.5		0
12/11/70	600	1.6			0.3	0.3		1.7
12/14/70	1200	0			2.9	1.1		1.7
12/15/70	1200	1.8			0.6	0.3		1.0
12/16/70	1200	4.5			0	0.2		0.2
12/17/70	1200	3.7			0.9	0.3		0.4
12/18/70	1200	4.1			0.4	0.2		1.0
12/21/70	1200	0.6			1.8	0.5		2.0
12/22/70	1200	3.3			0.4	0.4		1.6
12/23/70	1200	3.6			0.5	1.0		0.5
12/24/70	1200	4.8			1.5	1.0		0.6
12/25/70	1200	3.0			0.9	2.9		3.7

Table 67. HYDROGEN ION CONCENTRATIONS IN 24-HOUR COMPOSITE WASTEWATER SAMPLES
PRETREATMENT BY ADDITION OF CHLORINE
TREATMENT SYSTEM B

Date Samples Collected	Chlorine Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2B	3B	7B
10/31/70	150	7.0	7.05	7.2	7.4
11/2/70	150	6.5	6.9	7.2	7.4
11/3/70	150	7.0	7.3	7.4	7.5
11/4/70	150	7.1	7.3	7.3	7.4
11/5/70	150	7.1	7.4	7.4	7.5
11/6/70	150	7.2	7.4	7.5	7.5
11/9/70	150	7.0	7.4	7.5	7.6
11/10/70	150	7.15	7.3	7.55	7.5
11/12/70	150	7.2	7.6	7.8	7.6
11/13/70	300	7.5	7.5	7.1	7.6
11/17/70	300	7.15	7.45	7.55	7.55
11/18/70	300	7.1	7.3	7.8	7.5

Table 67. continued

Date Samples Collected	Chlorine Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2B	3B	7B
11/19/70	300	7.1	7.4	7.5	7.7
11/20/70	300	7.0	7.3	7.5	7.4
11/23/70	300	7.0	7.4	7.5	7.5
11/24/70	300	7.1	7.3	7.5	7.4
11/25/70	300	7.2	7.4	7.5	7.4
11/27/70	600	7.1	7.3	7.5	7.4
11/28/70	600	7.1	7.3	7.4	7.4
11/29/70	600	6.9	7.3	7.4	7.3
12/1/70	600	7.0	7.2	7.4	7.3
12/2/70	600	7.0	7.2	7.25	7.25
12/3/70	600	7.2	7.3	6.95	7.1
12/4/70	600	6.7	7.2	7.3	7.3
12/5/70	600	7.05	7.0	7.25	7.3

Table 67. continued

Date Samples Collected	Chlorine Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2B	3B	7B
12/7/70	600	6.7	7.1	7.3	7.3
12/8/70	600	6.7	7.0	7.2	7.2
12/9/70	600	6.55	7.2	7.25	7.24
12/10/70	600	6.7	7.0	7.3	7.3
12/11/70	600	7.0	7.2	7.3	7.3
12/12/70	1200	7.19	7.23	7.11	6.89
12/14/70	1200	6.4	6.8	7.0	7.0
12/15/70	1200	6.9	7.1	7.1	7.1
12/16/70	1200	7.0	7.2	7.3	7.2
12/17/70	1200	7.0	7.1	7.3	7.2
12/18/70	1200	7.2	7.4	7.4	7.2
12/19/70	1200	7.24	7.29	7.31	7.3
12/21/70	1200	6.9	7.1	7.2	7.1

Table 67. continued

Date Samples Collected	Chlorine Feed Rate (lbs/day)	pH Values of Wastewater Samples			
		1	2B	3B	7B
12/22/70	1200	7.2	7.21	7.25	7.16
12/23/70	1200	7.1	7.2	7.3	7.2
12/24/70	1200	7.0	7.2	7.3	7.2
12/25/70	1200	6.9	7.1	7.3	7.3

APPENDIX E

EXPERIMENTAL DATA

PRETREATMENT BY SELECT METHOD--CHLORINATION

Table 68. WASTEWATER FLOWS AND TEMPERATURES
PRETREATMENT BY CHLORINATION (300 lbs Cl_2/day)
COMBINED TREATMENT SYSTEM

Date	Flow (mgd)	Temperature (°F)	Date	Flow (mgd)	Temperature (°F)
1/15/71	11.4	--	2/4/71	5.9	46
1/16/71	11.1	--	2/5/71	6.9	50
1/17/71	9.3	--	2/6/71	6.6	--
1/18/71	10.8	--	2/7/71	6.1	--
1/19/71	9.8	42	2/8/71	7.6	--
1/20/71	9.5	46	2/9/71	8.5	--
1/21/71	9.3	50	2/10/71	7.4	44
1/22/71	9.5	--	2/11/71	7.2	48
1/23/71	5.5	--	2/12/71	7.9	52
1/24/71	8.7	--	2/13/71	9.5	--
1/25/71	9.7	50	2/14/71	10.3	--
1/26/71	11.1	44	2/15/71	10.1	48
1/27/71	10.1	41	2/16/71	9.7	50
1/28/71	9.7	43	2/17/71	9.6	50
1/29/71	9.0	48	2/18/71	9.7	52
1/30/71	9.4	--	2/19/71	9.8	54
1/31/71	8.6	--	2/20/71	9.7	--
2/1/71	6.3	43	2/21/71	9.5	--
2/2/71	6.0	41	2/22/71	10.1	50
2/3/71	6.0	45	2/23/71	10.4	50

Table 68. continued

Date	Flow (mgd)	Temperature (°F)	Date	Flow (mgd)	Temperature (°F)
2/24/71	10.3	50	3/16/71	9.1	--
2/25/71	10.3	52	3/17/71	8.8	--
2/26/71	10.2	52	3/18/71	8.2	52
2/27/71	10.2	55	3/19/71	9.5	50
2/28/71	10.2	--	3/20/71	8.2	52
3/1/71	10.2	52	3/21/71	7.7	--
3/2/71	9.6	50	3/22/71	8.6	54
3/3/71	9.5	48	3/23/71	8.0	52
3/4/71	7.6	--			
3/5/71	9.5	51			
3/6/71	9.4	54			
3/7/71	9.6	--			
3/8/71	10.5	48			
3/9/71	9.9	50			
3/10/71	9.9	--			
3/11/71	9.8	50			
3/12/71	9.2	54			
3/13/71	9.0	59			
3/14/71	8.4	--			
3/15/71	8.8	57			

Table 69. BOD_5 VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY CHLORINATION (300 lbs Cl_2/day) COMBINED TREATMENT SYSTEM

Date Samples Composited	BOD_5 Values (mg/l) of Wastewater Samples				% BOD_5 Removal
	1	2	3	7	
1/19/71	277	345	280	49	82
1/21/71	526	460	304	81	85
1/23/71	188	223	116	67	64
1/25/71	367	422	230	77	79
1/27/71	381	533	331	85	78
1/29/71	322	467	292	83	74
1/31/71	191	227	150	65	66
2/2/71	247	350	287	71	71
2/4/71	359	417	292	74	79
2/6/71	269	429	246	103	96
2/8/71	233	329	274	238	- 2
2/10/71	331	454	322	169	49
2/12/71	248	382	320	315	- 27
2/14/71	135	175	142	44	67
2/16/71	214	242	235	74	65
2/18/71	73	133	133	73	0
2/20/71	165	195	198	75	55
2/22/71	184	192	197	69	63
2/24/71	183	190	195	57	69
2/26/71	164	222	225	85	48

Table 69. continued

Date Samples Composited	BOD_5 Values (mg/l) of Wastewater Samples				% BOD_5 Removal
	1	2	3	7	
2/28/71	65	80	62	50	23
3/2/71	167	162	173	65	61
3/4/71	113	116	120	55	51
3/6/71	125	118	118	45	64
3/8/71	108	77	88	47	56
3/10/71	151	165	184	55	63
3/14/71	113	109	114	41	64
3/16/71	138	139	198	58	58
3/18/71	197	190	201	68	65

Table 70. COD VALUES OF 24-HOUR COMPOSITE WASTEWATER SAMPLES PRETREATMENT BY CHLORINATION (300 lbs Cl_2/day) COMBINED TREATMENT SYSTEM

Date Samples Composited	COD Values (mg/l) of Wastewater Samples 1	2	3	7	% COD Removal
1/19/71	768	1136	708	110	86
1/21/71	2384	1320	666	162	93
1/23/71	728	1008	248	166	77
1/25/71	1133	1591	643	127	89
1/27/71	925	925	525	155	83
1/29/71	648	1576	512	170	74
1/31/71	576	672	336	210	63
2/2/71	632	904	560	116	82
2/4/71	944	1064	528	72	92
2/6/71	519	832	248	222	57
2/8/71	720	272	252	506	30
2/10/71	608	840	456	298	51
2/12/71	480	680	408	796	- 66
2/14/71	184	200	136	102	45
2/16/71	260	260	264	134	48
2/18/71	264	288	165	260	1
2/20/71	160	184	140	166	- 4
2/22/71	180	200	204	64	64
2/24/71	304	244	244	142	53
2/26/71	184	356	280	188	- 2

Table 70. continued

Date Samples Composited	COD Values (mg/l) of Wastewater Samples				% COD Removal
	1	2	3	7	
2/28/71	296	169	161	138	53
3/2/71	207	242	230	113	45
3/4/71	219	230	342	150	31
3/6/71	104	173	115	106	- 2
3/8/71	150	238	342	115	23
3/10/71	188	257	242	109	42
3/15/71	122	437	160	74	39
3/17/71	223	338	342	127	43
3/19/71	242	311	315	171	29
3/21/71	142	246	169	142	0
3/23/71	303	284	334	215	29

Table 71. SUSPENDED SOLIDS LEVELS IN 24-HOUR COMPOSITE WASTEWATER SAMPLE PRETREATMENT BY CHLORINATION (300 lbs Cl_2/day) COMBINED TREATMENT SYSTEM

Date Samples Composited	SS Levels (mg/l) in Wastewater Samples				% SS Removal
	1	2	3	7	
1/18/71	330	485	132	32	90
1/19/71	450	575	320	82	82
1/20/71	370	530	170	18	95
1/21/71	900	570	340	44	95
1/22/71	760	--	230	16	98
1/23/71	400	550	140	66	84
1/24/71	600	800	220	24	96
1/25/71	610	750	260	44	93
1/26/71	220	280	110	43	80
1/27/71	450	630	260	55	88
1/28/71	290	860	170	39	87
1/29/71	230	440	130	37	84
1/30/71	140	250	130	71	49
1/31/71	240	270	50	95	60
2/2/71	300	570	320	71	76
2/3/71	200	390	100	23	89
2/4/71	550	460	170	44	92
2/5/71	90	240	40	41	54
2/6/71	540	1140	280	214	60

Table 71. continued

Date Samples Composited	SS Levels (mg/l) in Wastewater Samples				% SS Removal
	1	2	3	7	
2/7/71	580	1090	230	685	- 18
2/8/71	180	640	240	483	-168
2/9/71	170	310	110	122	28
2/10/71	170	430	170	97	43
2/11/71	300	620	270	79	74
2/12/71	200	560	160	420	-110
2/13/71	180	140	270	59	67
2/14/71	45	55	70	25	44
2/16/71	72	78	58	47	35
2/17/71	62	82	38	26	58
2/18/71	61	94	54	94	- 54
2/19/71	129	170	186	79	39
2/20/71	70	120	42	107	- 53
2/21/71	50	90	56	65	- 30
2/22/71	43	36	28	10	77
2/23/71	62	42	24	33	47
2/24/71	83	80	62	54	35
2/25/71	63	84	44	49	22
2/26/71	60	116	100	75	- 25
2/27/71	44	72	46	79	- 80

Table 71. continued

Date Samples Composited	SS Levels (mg/l) in Wastewater Samples				% SS Removal
	1	2	3	7	
2/28/71	59	38	26	53	10
3/1/71	90	76	64	51	43
3/2/71	85	90	40	58	32
3/3/71	60	76	58	55	8
3/4/71	66	90	62	66	0
3/6/71	27	54	12	44	- 63
3/7/71	20	40	6	26	- 30
3/8/71	27	28	20	21	22
3/9/71	62	74	62	54	13
3/10/71	69	124	52	49	29
3/11/71	75	112	54	81	- 8
3/12/71	40	72	30	77	- 93
3/14/71	64	144	32	34	47
3/15/71	45	152	22	14	69
3/16/71	140	120	94	44	69
3/17/71	79	114	46	56	29
3/18/71	67	110	40	86	- 28
3/19/71	104	124	72	86	17
3/20/71	121	114	60	76	37

Table 71. continued

Date Samples Composited	SS Levels (mg/l) in Wastewater Samples				% SS Removal
	1	2	3	7	
3/21/71	69	94	52	70	- 1
3/22/71	244	88	70	41	83
3/23/71	109	160	92	78	28

Table 72. TOTAL CHLORINE RESIDUALS IN WASTEWATERS
PRETREATMENT BY CHLORINATION (300 lbs Cl_2/day)
COMBINED TREATMENT SYSTEM

Date	Chlorine Residuals (mg/l) in Wastewaters		
	2	3	7
1/21/71	1.0	0.5	--
1/23/71	0.1	0.1	0.0
1/25/71	0.2	0.2	0.0
1/27/71	0.7	0.7	0.5
1/29/71	0.2	0.1	0.0
2/1/71	1.4	1.2	0.3
2/3/71	0.3	0.3	0.0
2/4/71	0.7	2.7	0.4
2/5/71	0.3	0.3	0.0
2/6/71	0.2	0.2	0.0
2/8/71	0.2	0.2	0.0
2/9/71	0.0	0.0	0.0
2/10/71	0.7	0.6	0.0
2/11/71	0.0	0.0	0.0
2/12/71	0.0	0.0	0.0
2/16/71	0.0	0.0	0.0
2/17/71	0.0	0.0	0.0
2/18/71	0.0	0.0	0.0
2/19/71	0.0	0.0	0.0
2/20/71	0.0	0.0	0.0

Table 72. continued

Date	Chlorine Residuals (mg/l) in Wastewaters		
	2	3	7
2/23/71	0.0	0.0	0.0
2/24/71	7.6	7.8	7.4
2/26/71	0.1	0.5	0.0
3/1/71	0.0	0.0	0.0
3/2/71	0.0	0.0	0.0
3/3/71	0.0	0.0	0.0
3/4/71	0.0	0.4	0.0
3/5/71	0.0	0.0	0.0
3/6/71	0.3	1.1	0.0
3/9/71	0.0	0.2	0.0
3/11/71	0.0	0.0	0.0
3/16/71	0.0	0.0	0.0
3/17/71	0.0	1.0	0.0
3/18/71	0.0	0.8	0.4
3/19/71	0.1	0.8	0.0
3/20/71	0.3	1.5	0.0
3/22/71	0.1	0.9	0.0